VOLUME 39 SEPTEMBER 1946 NUMBER 9

Southern Medical Journal

Journal of the Southern Medical Association

Copyright, Southern Medical Association, 1946. Published monthly by the Southern Medical Association, Empire Building, Birmingham 3, Alabama. Annual subscription $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

Southern Medical Association, Fortieth Annual Meeting, Miami, Florida, November 4-7

TABLE OF CONTENTS

Surgery of War Injuries of the Eyelids. Alston Callahan, Birmingham, Alabama 681

Discussed by Calhoun McDougall, Atlanta, Georgia; Harvey B. Searcy, Tuscaloosa, Alabama.

A Simple Aid in Difficult Abdominal Closures. Nicholas A. Schneider, St. Louis, Missouri 689

Guide for Nailing Fractures of the Femoral Neck. Joseph H. Gaston, Columbus, Georgia 690

Heart Complications in Infectious Mononucleosis: Report of a Case. Frank J. Geraghty, Baltimore, Maryland 693

Primary Atypical Pneumonia: A Report of 420 Cases with One Fatality During Twenty-Seven Months at Station Hospital, Camp Rucker, Alabama. Walter C. McCoy, Birmingham, Alabama 696

Spinal Fluid Protein in the Retrospective Diagnosis of Subclinical Poliomyelitis. M. B. Andelman, William I. Fishbein and Herman N. Bundesen, Chicago, Illinois and Albert E. Casey, Birmingham, Alabama 706

The Treatment of Early Syphilis with Penicillin. J. Lamar Callaway, Durham, North Carolina, Ray O. Noojin, Birmingham, Alabama, Beatrice H. Kuhn, Kathleen A. Riley and Arthur H. Flower, Jr., Durham, North Carolina 718

Effect of Topical Penicillin on Infections of the Upper Respiratory Tract. E. E. Menefee, Jr., and Robert J. Atwell, Durham, North Carolina.. 726

Delay in Diagnosing Malaria after Sulfadiazine Therapy: Two Case Reports. Sidney G. Page, Jr., and Joel V. McCall, Jr., Richmond, Virginia 728

Hydrogen Ion Concentration (pH) of Monilia Albicans Infection and Treatment. Karl John Karnaky, Houston, Texas 731

Discussed by James R. Bloss, Huntington, West Virginia; Frank Lock, Winston-Salem, North Carolina; John D. Weaver, Galveston, Texas; A. P. Hudgins, Charleston, West Virginia.

The Management of Diabetes Mellitus During Pregnancy. H. T. Engelhardt, and J. P. Melvin, Jr., Houston, Texas 734

Physical Therapy in a General Practice. G. J. P. Barger, Washington, District of Columbia 737

Continued on Next Page

TABLE OF CONTENTS
Continued

Results of Removal of Ruptured Intervertebral Discs and Combined Disc-Fusion Operations: An Analysis of 288 Operations. Harold H. Kuhn, Charleston, West Virginia and Robert G. Neill, Durham, North Carolina 745

Discussed by Lenox D. Baker, Durham, North Carolina; Earl D. McBride, Oklahoma City, Oklahoma.

EDITORIALS 751

Weight Gain and Fluid Balance in Pregnancy
Cause of Cancer
Oxygen and Glucose
Twenty-Five Years Ago

BOOK REVIEWS 754

MIAMI—WHERE WE MEET 756

Miami, Yesterday and Today, 1896-1946. Mr. Benton E. Jacobs, Miami, Florida.

AFTER MIAMI, HAVANA AND/OR NASSAU 758

SOUTHERN MEDICAL NEWS 760

The Tulane University of Louisiana

School of Medicine

POSTGRADUATE COURSES

December 2-6 ..... Pediatrics (for Specialists)
December 2-14 ..... Electrocardiography
January 6-May 24 ..... Tropical Medicine and Medical Parasitology
January 6-February 8 ..... Review of General Medical Practice
March 3-April 12 ..... Review of General Medical Practice Continued

For detailed information write

DIRECTOR

Division of Graduate Medicine

1430 Tulane Ave. **New Orleans 13, La.**

NEW (2nd) EDITION

MASON & ZINTEL'S PREOPERATIVE AND POSTOPERATIVE TREATMENT

Preoperative and postoperative care of the surgical patient calls for the combined skill and efforts of both the surgeon and attending physician . . . and on such care often depends the success of the outcome of the operation itself.

In performing this important function, the practitioner and surgeon alike will welcome the extensive guidance which this New (2nd) Edition makes available.

Beginning with the general preparation of the patient, the authors take up in systematic and detailed fashion such aspects as conditions affecting the operative risk; diagnosis and treatment of nutritional disorders in the surgical patient; risk and management of the patient with heart disease, hypertension, nephritis, and diabetes.

There are chapters on anesthesia, shock, water balance, blood transfusion, acidosis and alkalosis, care of the wound, postoperative complications including pulmonary venous thrombosis and other situations which so frequently may arise.

By Robert L. Mason, Lt. Col., M.C., A.U.S., Cushing General Hospital; and Harold A. Zintel, M.D., Harrison Department of Surgical Research, University of Pennsylvania School of Medicine. 584 pages, with 157 illustrations, $7.00

SEND ORDERS TO

J. A. MAJORS COMPANY

New Orleans 13 **Dallas 1**

PAUL B. HOEBER, INC.

Medical Book Department of Harper & Brothers

DISTINGUISHED HOEBER BOOKS

Coming Soon!

MENGERT'S Postgraduate Obstetrics

Here is a **different** kind of book on obstetrics destined for great popularity. It stems from the author's wide experience giving postgraduate courses for clinicians as well as his extensive clinical background at leading institutions. The common problems of obstetrics are stressed. A multitude of practical questions are answered—the questions every family physician would like to take to a postgraduate course if he could get away. Many troublesome topics, which are searched for in vain in the usual obstetric text, are covered here in simple, direct fashion. Numerous illustrations, mostly original, help clarify the problems of everyday practice. Because popular books go out of stock so quickly these days, send for Mengert's Postgraduate Obstetrics now, on approval, to be sure of seeing a copy on publication. No need to keep it if it doesn't fully meet your expectations.

By WILLIAM F. MENGERT, M.D., Chm. Dept. Ob. & Gyn., Southwestern Med. College.

Ready Soon, probably $6.00

New 2nd Edition!

MacKEE and CIPOLLARO'S Skin Diseases in Children

2nd Printing Just Off Press.—This practical guidebook has met with instant approval. Within a few months of publication a second large printing of the new revised second edition has been called for! Completely rewritten, considerably enlarged, with many new treatments, new chapters, new illustrations, this edition now offers a complete clinical guide to the management of cutaneous affections of infancy and childhood. Family physician, pediatrician and dermatologist will find this authoritative volume of constant usefulness in handling a troublesome group of cases.

By GEORGE M. MacKEE, M.D., and ANTHONY C. CIPOLLARO, M.D., N. Y. Post-Graduate Medical School, Columbia, with contributed chapters by 4 distinguished authorities. **466 pp., 229 illus., some in color, $7.50**

On Approval Coupon

SMJ 9

PAUL B. HOEBER, INC.
49 East 33rd St., New York 16.
Send me the book(s) checked:

☐ MENGERT'S Postgraduate Obstetrics. . . **On publication**
☐ MacKEE and CIPOLLARO'S Skin Diseases in Children . . . **$7.50**

☐ Charge my Account ☐ Check Enclosed ☐ On Approval

Name.....

Addres:..... Zone..... State.....

GOOD MEDICAL BOOKS
RECENTLY REVISED AND DEPENDABLE

Stander's

OBSTETRICS (formerly Williams' Obstetrics)
By Henricus J. Stander, M.D., F.A.C.S. 1287 pages. 973 illustrations on 740 figures, many in color. Published Sept. 21, 1945. $10.00

Kolmer's

PENICILLIN THERAPY Including Streptomycin, Tyrothricin and Other Antibiotic Therapy
By John A. Kolmer, M.D., F.A.C.P., 2nd Edition ready October, 1946. 335 pages. Illustrated. On press.

Christian's Osler

PRINCIPLES AND PRACTICE OF MEDICINE
By Henry A. Christian, M.D., F.A.C.P. 1600 pages. 15th Edition.
Published March 10, 1944, 3rd Printing. $9.50

Cole & Puestow's

FIRST AID: SURGICAL AND MEDICAL
By Warren H. Cole, M.D., F.A.C.S., Charles B. Puestow, M.D., F.A.C.S., and 17 collaborating physicians and surgeons. 434 pages. 193 illustrations. 3rd Edition.
Published May 3, 1945. $3.00

Kolmer & Boerner's

APPROVED LABORATORY TECHNIC
By John A. Kolmer, M.D., F.A.C.P., Fred Boerner, V.M.D., and 30 contributing authors. 1088 pages. 368 illustrations. 4th Edition.
Published Feb. 6, 1945. $10.00

Cole & Elman's

TEXTBOOK OF GENERAL SURGERY
By Warren H. Cole, M.D., F.A.C.S., Robert Elman, M.D., F.A.C.S., and 18 consulting authors. 1170 pages. 955 illustrations. 4th Edition.
Published March 31, 1944. $10.00

Yater's

FUNDAMENTALS OF INTERNAL MEDICINE
By Wallace M. Yater, M.D., F.A.C.P., with 13 contributing authors. 1262 pages. 275 illustrations. 2nd Edition.
Published July 28, 1944. $10.00

Kolmer's

CLINICAL DIAGNOSIS BY LABORATORY EXAMINATIONS
By John A. Kolmer, M.D., F.A.C.P. 1280 pages. 182 illustrations.
1st Edition Revised. Published April 24, 1944. $10.00

Order from your local store, dealer or

D. APPLETON-CENTURY COMPANY
35 West 32nd Street, New York 1

NEW SECOND EDITION

Tassman's

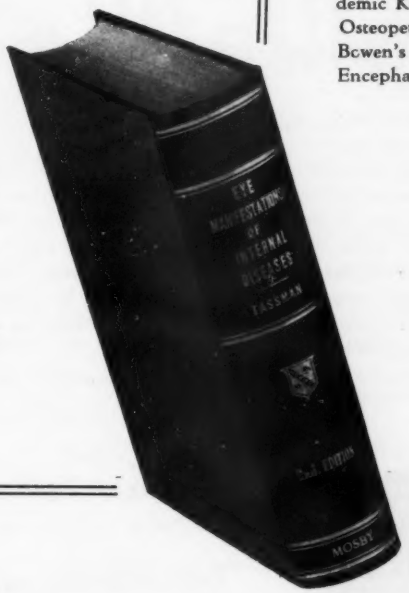
The EYE MANIFESTATIONS of INTERNAL DISEASES

by

I. S. TASSMAN, M.D.
Associate Professor of Ophthalmology, Graduate School of Medicine, University of Pennsylvania, Philadelphia.

611 pages, 243 illustrations, including 24 in color.

Price, $10.00



Just Released

For this Second Edition the author has retained his systematic arrangement of material and simple style. However, many important additions and changes have been made in order to bring the book up to date and improve its value as a reference.

- A number of diseases have been added to the discussion, including: Ocular Allergy, Epidemic Keratoconjunctivitis, Hurler's Disease, Osteopetrosis, Lymphogranuloma Venereum, Bowen's Disease of the Cornea, Toxoplasmic Encephalomyelitis, and Purtscher's Disease.
- Many new references and additions to diseases previously discussed are included.
- Greater space has been devoted to treatment, and the most recent methods and forms presented wherever possible.
- The text matter has been increased by 13% and over forty new illustrations have been added or substituted.

Order Now!

The C. V. Mosby Company **SMJ 9/46**
3207 Washington Blvd.
St. Louis 3, Missouri

Gentlemen: Send me a copy of the new Second Edition Tassman's
EYE MANIFESTATIONS OF INTERNAL DISEASES

.....Attached is my check for $10.00 .....Charge my account.

Name .....

Address .....

to combat

mental depression in the menopause

". . . because the involutional period is fraught with sadness the different forms of mental disorder of this age may be highly colored with mental depression."*

Severe menopausal depression, marked by apathy and psychomotor retardation, is frequently progressive. Hence, if not promptly and effectively treated, it may seriously impair the patient's normal capacity for useful living.

In such cases, Benzedrine Sulfate helps to overcome the depression, to restore optimism and to reawaken the savor and zest of life. Needless to say, Benzedrine Sulfate is not indicated in the casual case of low spirits, as distinguished from true prolonged mental depression.

*Hinsie, Leland E.: The Person in the Body, an Introduction to Psychosomatic Medicine, New York, W. W. Norton & Co., 1945, p. 223.

b

Tablets and Elixir

benzedrine sulfate

(racemic amphetamine sulfate, S.K.F.)

Smith, Kline & French Laboratories, *Philadelphia, Pa.*

efficient, low-dosage treatment of ulcerative colitis with

'Sulfathalidine'

Phthalylsulfathiazole

This *nontoxic, low-dosage*, enteric sulfonamide is exceptionally effective against acute and chronic ulcerative colitis, and recently proved successful in the treatment of 76 out of 80 patients[1] with this disease. After therapy with the drug, stools become formed and odorless, blood in stools disappears, cramping in abdomen subsides within 48 hours, and evacuations are reduced substantially.[2]

'SULFATHALIDINE' *phthalylsulfathiazole* is indicated also in the treatment of regional ileitis, as a supplement to the therapy of amebiasis, giardiasis and paratyphoid infections, and as an adjunct to intestinal surgery.

'SULFATHALIDINE' *phthalylsulfathiazole* maintains a *high bacteriostatic concentration* in the gastrointestinal tract (1250 mg. per cent). An average of only 5% of the drug is absorbed from the bowel and this is rapidly excreted by the kidneys. Administered in daily doses of only 0.05 Gm. to 0.1 Gm. per kilogram of body weight. Supplied in 0.5-Gm. compressed tablets in bottles of 100, 500 and 1,000. Sharp & Dohme, Philadelphia 1, Pa.

1. J.A.M.A. *129*:1080, Dec. 15, 1945
2. Illinois M. J. *88*:85, August, 1945

SHARP & DOHME

Introducing a new treatment for

COMMON EYE INFECTIONS

Sodium sulfacetimide is the only sulfonamide which can be dissolved to a concentration as high as 30 per cent at physiologic pH. It is, therefore, both surpassingly bacteriostatic against a wide variety of organisms and virtually non-irritating—attributes which make it an especially valuable topical chemotherapeutic agent for prophylaxis and treatment of infections of delicate ocular tissues.

SODIUM SULFACETIMIDE SOLUTION 30% has marked and rapid penetrating powers when applied locally in the form of eyedrops, reaching a high concentration in the cornea and conjunctiva within five minutes.

SODIUM SULFACETIMIDE SOLUTION 30% (*Sodium* SULAMYD)

is indicated for the local treatment of acute infectious conjunctivitis, acute corneal ulcer, acute blepharoconjunctivitis, hypopyon keratitis and for prophylaxis following foreign body injuries and abrasions of the cornea and conjunctiva.

Dosage: One drop placed in the affected eye every two to four hours. Available on prescription in 15 cc. amber, eyedropper bottles.

Trade-Mark SULAMYD—Reg. U.S. Pat. Off.

Schering CORPORATION · BLOOMFIELD, N. J.

IN CANADA, SCHERING CORPORATION LIMITED, MONTREAL

Paired for harmonious performance

Two time-proved therapeutic agents—chemically united—provide symptomatic relief of colds and sinusitis. NEO-SYNEPHRINE promotes breathing comfort and normal sinus drainage. SULFATHIAZOLE may limit the infection and minimize complications due to secondary invaders.

Neo-Synephrine
BRAND OF PHENYLEPHRINE
Sulfathiazolate

For Decongestion and Bacteriostasis

THERAPEUTIC APPRAISAL: Prompt, prolonged decongestion of nasal mucosa; ample bacteriostatic action without excess sulfathiazole; sustained effectiveness even on repeated use; isotonic, non-irritating, essentially free from side effects.

INDICATED for decongestive effects and possible bacteriostatic influence in combating secondary invaders accompanying common colds and sinusitis.

ADMINISTRATION may be by dropper, spray or tampon, with dosage determined by individual needs. Patients should be cautioned to use only as directed.

SUPPLIED in 0.6% solution, bottles of 1 fl. oz. and 1 pint.

Trial Supply Upon Request.

Frederick Stearns & Company
Division
DETROIT 31, MICHIGAN

NEW YORK KANSAS CITY SAN FRANCISCO WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

Trade-Mark Neo-Synephrine Sulfathiazolate Reg. U. S. Pat. Off.

to correct inadequacie
White
LABORATORIES, INC.
White's
Pharmaceutical Manufacturers, Newark 7, N.J.

in infant diets

The average diet of early infancy provides *less* than minimum daily requirements of the clinically essential B vitamins*. Any undue drain on infant reserves will result in still more serious deficiencies.

WHITE'S MULTI-BETA LIQUID

provides the major B factors (thiamine, riboflavin and nicotinamide) in amounts *directly proportionate to their average inadequacy in such diets.* In dosage of five drops daily, White's Multi-Beta Liquid raises the vitamin B content of the early infant diet to optimal levels. Non-alcoholic, palatable; freely soluble in milk mixtures and orange juice, or suitable for direct administration. *Notably stable.*

Supplied in bottles (with suitable droppers) of 10 cc., 25 cc. and 50 cc.

*Marriot, W. McK.: Infant Nutrition, 3rd Edition, revised by Jeans, Mosby, St. Louis, 1941. Jeans, P. C.: J. A. M. A., *120*:913, 1942.

Multi-beta *Liquid*

Dependable Nourishment

DURING THAT *all-important* FIRST YEAR OF LIFE

The well nourished baby is more resistant to the common ills of infancy. Moreover it is during that all-important first year of life that the very foundation of *future* health and ruggedness is laid. Similac-fed infants are notably well nourished; for Similac provides breast milk proportions of fat, protein, carbohydrate and minerals, in forms that are physically and metabolically suited to the infant's requirements. Similac dependably nourishes the bottle fed infant — *from birth until weaning.*

ACCEPTED AMERICAN MEDICAL ASSN. Council on Foods and Nutrition

A powdered, modified milk product especially prepared for infant feeding, made from tuberculin tested cow's milk (casein modified) from which part of the butter fat is removed and to which has been added lactose, olive oil, cocoanut oil, corn oil and fish liver oil concentrate.

SIMILAC } SIMILAR TO HUMAN MILK

M&R DIETETIC LABORATORIES, INC. • COLUMBUS 16, OHIO

. . Cairo *calling* Kokomo

An impressive reservoir of experience on the use of Pentothal Sodium by military and civilian surgeons and anesthetists throughout the world in recent years has been recorded in a huge store of literature—nearly 800 reports since 1934. As a result, the surgeon today has at his disposal a valuable guide covering every phase of intravenous anesthesia with Pentothal Sodium—its indications and contraindications, advantages and disadvantages, precautions and techniques of administration. This accumulated worldwide experience enables him to use Pentothal Sodium with greater convenience, added safety and increased effectiveness—advantages that greatly enhance the usefulness of intravenous anesthesia. ABBOTT LABORATORIES, North Chicago, Illinois.

New Pentothal Film

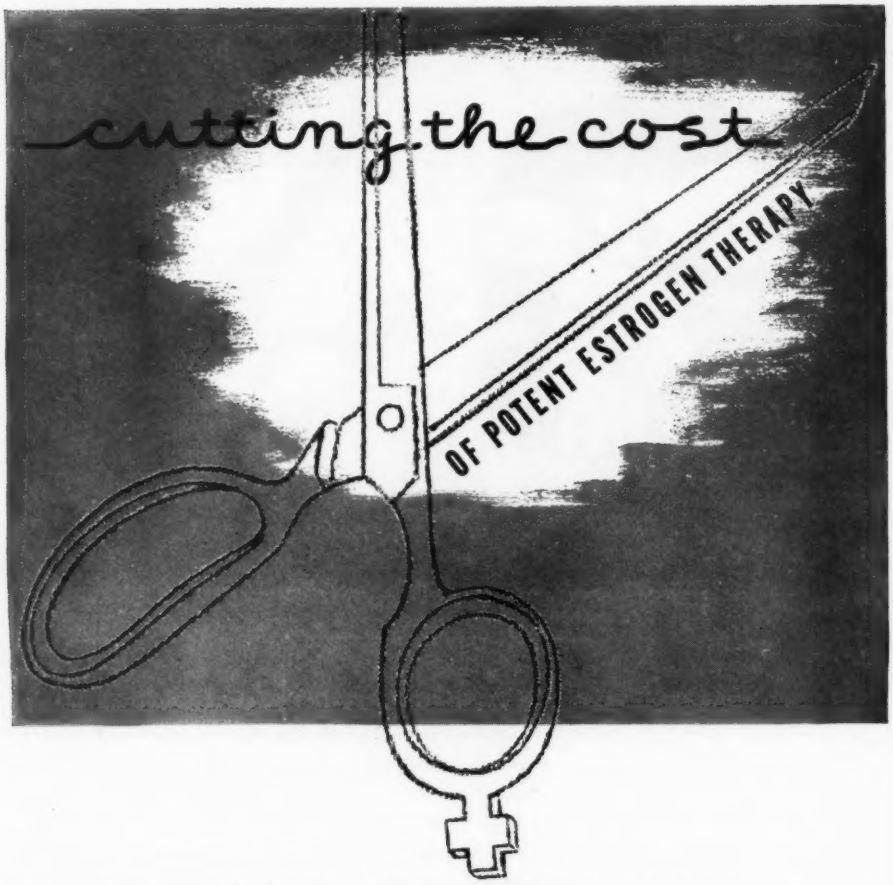
Medical groups interested in intravenous anesthesia may arrange for the showing of a new motion picture film on the use of Pentothal by writing to the Medical Department, Abbott Laboratories, North Chicago, Illinois.

Pentothal Sodium

REG. U. S. PAT. OFF.

[Sodium Ethyl (1-methyl-butyl) thiobarbiturate, Abbott]

FOR INTRAVENOUS ANESTHESIA



By prescribing Lynoral,* the physician can provide highly effective, well-tolerated, economical estrogen therapy for his patients—even for those of restricted means. Lynoral is the Roche-Organon brand of ethinyl estradiol which is "highly effective by the oral route . . . and from five to twenty times as potent as diethylstilbestrol by mouth."[1] Because of its exceptionally high potency, Lynoral has a dependable estrogen effect in surprisingly small amounts. In fact, doses measured in hundredths of a milligram usually suffice to provide gratifying relief of menopausal symptoms at a cost within the means of nearly every patient. Lynoral tablets, each containing 0.05 mg of ethinyl estradiol, are available in bottles of 30, 60, 250 and 1000; each tablet is scored to facilitate dosage adjustment.

ROCHE-ORGANON, INC., ROCHE PARK, NUTLEY 10, N. J.

* Reg. U. S. Pat. Off.
[1] J. Hoffman, Female Endocrinology, W. B. Saunders Co., Philadelphia, Pa., 1944, p. 709

LYNORAL
'ROCHE-ORGANON'

With this in hand

The Cardiologist

is assured of

Dependability in Digitalis Administration

• • •

Being the powdered leaves made into
physiologically tested pills,
all that Digitalis can do, these pills will do.

Trial package and literature sent to physicians on request.

DAVIES, ROSE & COMPANY, Limited

Manufacturing Chemists, Boston 18, Massachusetts

D14

Nupercainal, the soothing anesthetic ointment containing 1% Nupercaine, is noted for its sustained effect in the relief of pain associated with the above and other ano-rectal conditions.

Many physicians employ Nupercainal, too, in painful proctological and vaginal examinations.

Available in tubes of 1 ounce with applicator and in jars of 1 pound.

Nupercainal

Nupercainal and Nupercaine...Trade Marks Reg. U. S. Pat. Off.

CIBA PHARMACEUTICAL PRODUCTS, INC.
SUMMIT, NEW JERSEY
In Canada: Ciba Company Limited, Montreal

Extinguish the Pillars of Fire . .

Fed by psychosomatic "fuel" in the form of hypersecretion, vagus irritation and intestinal spasticity, many cases of hyperkinetic intestinal disease may often be effectively "quenched" by Lusyn — newly created in the research laboratories of The Maltbie Chemical Company to satisfy the most modern concepts of rational therapy in spastic gastro-enteropathies and hyperchlorhydria, with least disturbance of physiologic processes. • At once *antispasmodic* (by virtue of its homatropine methylbromide content) . . . *adsorbent* (through the alukalin component) . . . and *sedative* (because of the phenobarbital incorporated)—Lusyn brings prompt relief, yet is non-narcotic and will not produce secondary acid rebound. • *Indicated* in the treatment of pylorospasm—cardiospasm—unstable colon—biliary dyskinesia—biliary colic—and as an adjunct in the management of peptic ulcer. *Supplied* in bottles of 100 tablets each.

THE MALTBIE CHEMICAL COMPANY (Founded 1888) NEWARK, N. J.

LUSYN
TABLETS

Pyridium, administered orally in a dosage of 2 tablets *t.i.d.*, will promptly relieve distressing urinary symptoms in a large percentage of ambulant patients, thereby permitting them to pursue their normal activities without undue disturbance.

The prompt symptomatic relief provided by Pyridium is extremely gratifying to such patients suffering with the disturbing symptoms of painful, urgent, and frequent urination, tenesmus, and irritation of the urogenital mucosa.

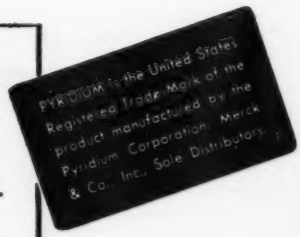
Therapeutic doses of Pyridium may be administered with virtually complete safety throughout the course of cystitis, pyelonephritis, prostatitis, and urethritis.

REG. U.S. **PYRIDIUM** PAT. OFF.

(Phenylazo-alpha-alpha-diamino-pyridine mono-hydrochioride)

MERCK & CO., Inc. RAHWAY, N. J.

Manufacturing Chemists


PYRIDIUM is the United States
Registered Trade Mark of the
product manufactured by the
Pyridium Corporation. Merck
& Co., Inc., Sole Distributors

A 12 X 15 REPRODUCTION OF THIS HERMAN GIESEN PAINTING, SUITABLE FOR FRAMING, IS AVAILABLE UPON REQUEST

You'll need a stethoscope this year, Son

NOTHING could be more appropriate as a gift from a physician to his son than a stethoscope, traditional symbol of medical art. And nothing could be more complimentary to a father than to have his son choose the profession which he himself has followed. There is something basically significant and deeply gratifying about the succession of one member of a family to the position occupied by another. Particularly is this true in medicine.

Eli Lilly and Company enjoys the distinction of having remained under the active direction of one family since its inception seventy years ago. Each succeeding generation has brought to the organization new perspective, new vigor, new strength. Through the years there has been no change in the basic principles on which the business was founded. Honesty, integrity, and unqualified sincerity govern every operation. Specify "Lilly" with full confidence.

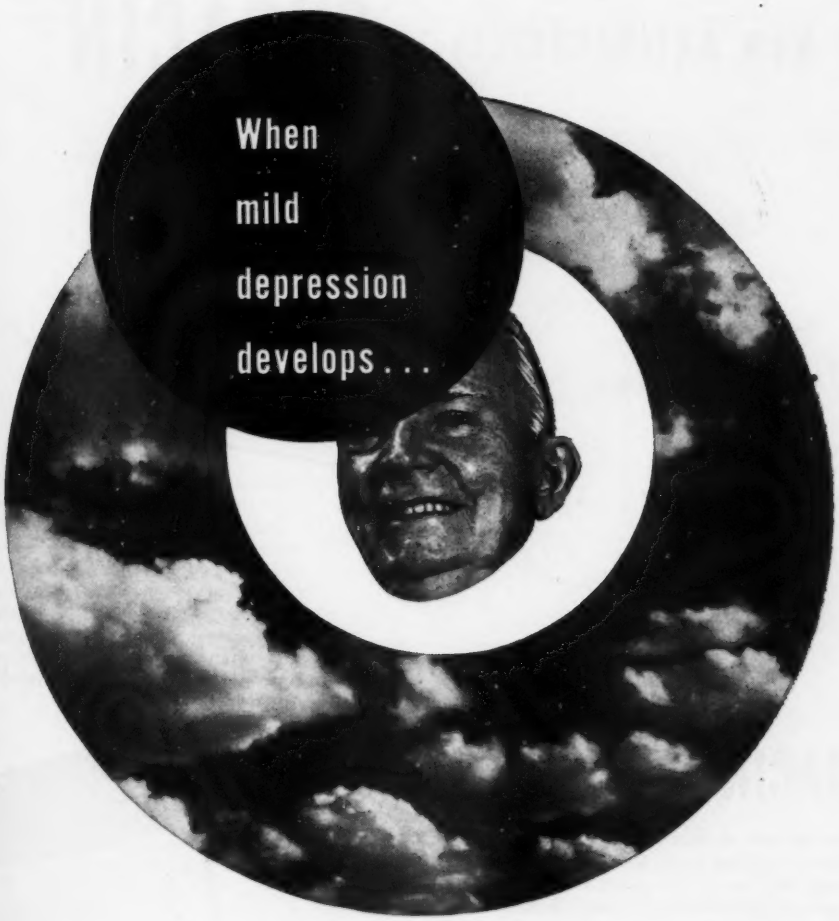
A picture of The Good Samaritan provided the inspiration that

eventually led to the founding of Eli Lilly and Company

Sulfonamides

Sulfonamides bearing the Lilly Label are characterized by that uniformity in appearance, accuracy of dosage, rapidity of disintegration, and therapeutic dependability toward which all standardization is directed. Lilly sulfonamide products are offered to the medical profession in logical dosage forms and sizes.

ELI LILLY AND COMPANY
INDIANAPOLIS 6, INDIANA, U. S. A.



. . . during Convalescence . . . in Dysmenorrhea . . . following Childbirth . . . at the onset of the Menopause . . . following Bereavement or Misfortune . . . in Old Age . . .

. . . *Dexedrine* may be relied upon to increase the patient's accessibility to treatment; to effect a remarkable improvement in mood and outlook; and to aid in restoring a normal grip on life and living.

Dexedrine Sulfate tablets
(dextro-amphetamine sulfate)

Smith, Kline & French Laboratories, *Philadelphia*

The new antibacterial . . . FURACIN

Furacin Soluble Dressing is being used successfully in the treatment of: infected surface wounds, or for the prevention of such infection; infections of third and fourth degree burns; carbuncles and abscesses after surgical intervention; infected varicose ulcers; infected superficial ulcers of diabetics; secondary infections of eczema; impetigo of infants and adults; treatment of skin-graft sites; osteomyelitis associated with compound fractures; secondary infections of dermatophytoses.

Now available in

FURACIN SOLUBLE DRESSING

Furacin—newest of the modern antibacterials—is a nitrofuran. It is effective against many gram-negative and gram-positive organisms, both in vivo[1,2] and in vitro[3,4]; its antibacterial spectrum[3] compares favorably with those of other modern antibacterial agents. It is low in toxicity[5]; is effective in the presence of wound exudates; possesses excellent stability. Sensitization occurs infrequently.

Furacin Soluble Dressing contains 0.2% of this new antibacterial (5-nitro 2-furaldehyde semicarbazone), in an anhydrous base composed of carbowax (75%) and propylene glycol (25%). It melts at body temperature; its low surface tension facilitates spreading to all parts of wounds. Being water soluble, it mixes with wound exudates, penetrating pockets of pus and blood. It does not macerate the skin; is not irritating to tissue; does not retard the healing rate of wounds.

Full details will be sent you on request to The Medical Director, Eaton Laboratories, Inc., Norwich, New York.

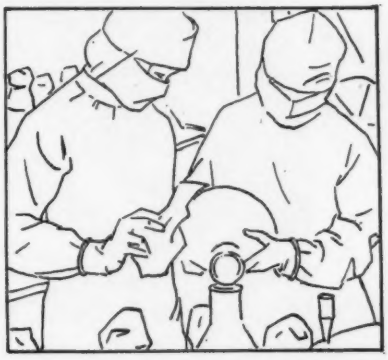
EATON LABORATORIES Inc.
NORWICH, NEW YORK

1. Neter, E., & Lambarti, T. G., Am. J. Surgery. In press
2. Snyder, M. L., Kiehn, C. L., & Christopherson, J. W., Military Surgeon *97*:380, 1945
3. Dodd, M. C., & Stillman, W. B., J. Pharmacol. & Exper. Therap. *82*:11, 1944
4. Cramer, D. L., & Dodd, M. C., J. Bacteriology *51*:293, 1946
5. Krantz, J. C., & Evans, W. E., J. Pharmacol. & Exper. Therap. *85*:324, 1945

Accepted by the Council on Pharmacy and Chemistry of the American Medical Association.

PENICILLIN SCHENLEY CONTROL

***here* . . .**



. . . insures your confidence here

SCHENLEY LABORATORIES, INC.
Producers of Penicillin Schenley
Executive Offices:
350 Fifth Avenue, New York City

At the Schenley Laboratories, a system of control of vast proportions insures maximum purity, potency, and pyrogen-freedom for the end product which bears the label Penicillin Schenley.

Since its production is safeguarded with such skill and precision at every step, Penicillin Schenley may be used with fullest confidence at all times.

"The logical food

TO FORTIFY
WITH
VITAMIN D"

"Since milk is the main food of children at the age when they are most susceptible to rickets, it has been agreed upon as the logical food to fortify with vitamin D. In this way the three nutrients, calcium, phosphorus, and vitamin D, in good proportions would be consumed together."
—"Foods—Enriched, Restored, Fortified"; Bureau of Human Nutrition and Home Economics, U. S. Dept. of Agriculture, 1945.

A milk capably fulfilling the conditions set forth above is Carnation Evaporated Milk. Its fortification with 400 U. S. P. units of vitamin D_3 per pint is at the accepted level for the prevention of rickets in normal infants and children, and for good bone and tooth development and excellent growth.

But there are additional reasons for the widespread favor enjoyed by Carnation Milk for infant feeding and various special dietary uses. Especially important is uniformity of composition and flavor, insured by scientific processing and central laboratory supervision over production in all Carnation evaporating plants. Also, sterility and digestibility are recognized Carnation Milk qualities.

Carnation Evaporated Milk is a *logical* choice for milk diets for all ages.

Carnation Milk

FORTIFIED WITH VITAMIN D_3

"From Contented Cows"

A SIMPLIFIED *NEW* TECHNIQUE FOR PROVIDING

prolonged penicillin action

Penicillin in Oil and Wax, providing the prolonged action afforded by prolonged absorption[1,2], can now be administered quickly and easily. Three major Squibb improvements greatly simplify and improve administration technique:

FREE-FLOWING SUSPENSIONS. The new Squibb Penicillin in Oil and Wax flows freely through 20-gauge needles without preheating when at room temperature.

DOUBLE-PURPOSE CARTRIDGES. One cell contains 1 cc. Squibb Penicillin in Oil and Wax, 300,000 units; second cell contains 1 cc. sterile Aspirating Solution, permitting aspiration to check proper location of needle before penicillin administration.

METAL CARTRIDGE SYRINGES. The new B-D* Cartridge Syringes are designed for repeated use with readily changeable cartridges and needles. *T.M. Reg. Becton, Dickinson & Co.

1. Kirby, W. M. M.; Leifer, W.; Martin, S. P.; Rammelkamp, C. H., and Kinsman, J. M.: J.A.M.A. 129:940 (Dec. 1) 1945. 2. Romansky, M. J., and Rittman, G. E.: Science 100:196 (Sept. 1) 1944.

AVAILABLE NOW IN LIMITED QUANTITIES ONLY

SQUIBB *Penicillin*

IN OIL AND WAX

DOUBLE-CELL CARTRIDGES—METAL CARTRIDGE SYRINGES

accepted

for New and Nonofficial Remedies by the Council on Pharmacy and Chemistry of the American Medical Association.

PERTUSSIS ENDOTOXOID-VACCINE

ACCEPTED AMERICAN MEDICAL ASSN. Council on Pharmacy and Chemistry

Bacterial Vaccine and Bacterial Antigen Combined.
Made from H. pertussis phase I organisms.

Ayerst Pertussis Endotoxoid-Vaccine is made by suspending H. pertussis phase I organisms in a formalized endotoxin solution prepared from H. pertussis phase I. The resulting Pertussis Endotoxoid-Vaccine is both antibacterial and antiendotoxic, thus providing immunity to the H. pertussis organisms and to the endotoxin produced by these organisms.

Ayerst Pertussis Endotoxoid-Vaccine is available in vials of 6 cc. and 24 cc.

Ayerst

AYERST, McKENNA & HARRISON Limited, 22 East 40th Street, New York 16, N. Y.

AMONG the many conditions which especially enlist the sympathy of the physician—and tax his efforts to ameliorate the psychic as well as the somatic symptomatology—are boils and acne.

A growing literature reports the value of Staphylococcus Toxoid in the prophylaxis and therapy of various staphylococcic pyodermas and localized pyogenic processes due to *S. aureus* and *albus.* The toxoid induces the production of staphylococcus antitoxin in immunized persons, and there is accumulating evidence of its value in producing active immunity to the dermonecrotic and hemolytic elements of the toxins of *S. aureus* and *albus,* irrespective of the strain of the infecting organism.

Staphylococcus Toxoid (Pitman-Moore) is supplied in 5 cc. vials containing in each cubic centimeter the toxoid derived from 1,000 necrotizing doses of the toxin. Preserved with 1:10,000 sodium ethyl mercuri thiosalicylate. Comprehensive information with each package.

Recommended for Treatment and Prevention of

- Recurrent styes, boils, carbuncles
- Pustular acne associated with furunculosis
- Recurrent migratory staphylococcus abscesses of soft tissues and bone
- Staphylococcal infection of accessory nasal sinuses
- Other staphylococcal infections

ACCEPTED AMERICAN MEDICAL ASSN.

PITMAN-MOORE COMPANY

PHARMACEUTICAL AND BIOLOGICAL CHEMISTS

Division of Allied Laboratories, Inc., • Indianapolis 6, Indiana

RHEUMATOLOGISTS agree that in the primary stages of arthritis, when only the periarticular or other soft tissues are affected, the pathologic changes are reversible and hence ultimate recovery is possible.

The newer knowledge of arthritis—which emphasizes the systemic nature of the disease—is the basis for a more optimistic prognosis, even in the advanced stages of chronic arthritis when the osseous and cartilaginous changes have become irreversible.

Though the roentgenologically discernible anatomic

DARTHRONOL FOR THE

J. B. ROERIG & COMPANY • 536 Lake Shore Drive

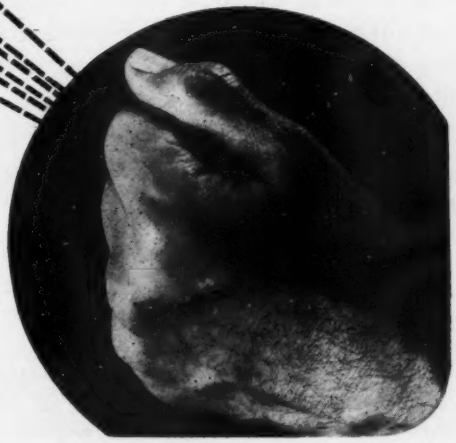
changes may be beyond repair, adequate systemic therapy, optimal nutrition, physiotherapy, and orthopedic measures can do much to prevent or correct deformities, relax painful spastic muscles, abolish pain, and restore useful function.

Darthronol, because of the pharmacodynamic and nutritional influences of its nine active ingredients, warrants inclusion in the complete arthritis rehabilitation program. In addition to exerting the favorable influence in arthritis attributed to vitamin D, Darthronol plays an important role in the aim to improve the general well-being, to correct the multiple systemic disturbances associated with chronic arthritis, and to restore the nutritional status to optimal levels—a truly rational approach to the rehabilitation of the chronic arthritic.

EACH CAPSULE CONTAINS

Vitamin D (Irradiated Ergosterol)	50,000 U.S.P. Units
Vitamin A (Fish-Liver Oil)	5,000 U.S.P. Units
Ascorbic Acid	75 mg.
Thiamine Hydrochloride	3 mg.
Riboflavin	2 mg.
Pyridoxine Hydrochloride	0.3 mg.
Calcium Pantothenate	1 mg.
Niacinamide	15 mg.
Mixed Natural Tocopherols	3.4 mg.

(Equivalent in biological activity to 3 mg. of Alpha Tocopherol)



Even when the osseous and cartilaginous changes have become irreversible, a complete rational therapeutic program can accomplish much in abolishing pain, diminishing soft tissue swelling and restoring useful function.

ARTHRITIC

Chicago 11, Illinois

Sturdy

ON STRONG FOUNDATIONS

The 2000 year old Nile Temple of Philae stands enduringly firm on its original foundation—even though flooded each year from November to June, since the construction of the Assuan Dam at the end of the nineteenth century. • Similarly, for sturdy bodies in later years a strong nutritional foundation must be established early in infancy. • For this assurance, BIOLAC safely and simply furnishes nutritional elements for optimum health. Among the other essential nutrients are valuable proteins of milk, an outstanding source of *all the essential amino acids* ... the indispensable foundation stones for sound tissues. • Indeed, BIOLAC is "baby talk" for a good square meal.

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE • NEW YORK 17, N. Y.

Biolac

The foundation is the thing!

Biolac is a liquid modified milk, prepared from whole and skim milk with added lactose, and fortified with thiamine, concentrate of vitamins A and D from cod liver oil, and iron citrate; only Vitamin C supplementation is necessary. Evaporated, homogenized and sterilized. Available in 13 fl. oz. tins at all drug stores.

Quickly prepared... easily calculated: 1 fl. oz. Biolac to 1½ fl. oz. water per lb. of body weight.

CĒPACOL

ALKALINE GERMICIDAL SOLUTION

. . . a powerful non-mercurial antiseptic

. . . a mucin-clearing detergent

. . . a pleasant, soothing alkaline solution

MERRELL 1828

Cēpacol combines a foaming detergency with powerful bactericidal action. These properties, plus its freedom from toxic or irritating effects in clinical use, especially recommend it for infections of the pharyngeal mucous membrane.

Low surface tension enables Cēpacol to penetrate mucosal recesses, where its cleansing and germicidal actions become immediately effective against the bacteria-laden mucin.

Soothing and mildly alkaline, Cēpacol is effective in post-tonsillectomy hygiene and all throat inflammations. Its taste is especially pleasant and refreshing. May be used as a spray or gargle.

Available in pints and gallons at all prescription pharmacies.

Trademark "Cepacol" Reg. U. S. Pat. Off.

THE WM. S. MERRELL COMPANY • CINCINNATI, U. S. A.

Gelu-cillin 'WARNER'

50,000 UNITS OF PENICILLIN PER TABLET

Pleasing taste results in greater patient acceptance

GELU-CILLIN tablets are singularly free of the usual moldy odor and taste of most oral penicillins

More comfort during maintenance of penicillin blood levels

High potency provides greater convenience in day and night therapy

Supplied in packages of 12 hermetically sealed scored tablets

WILLIAM R. WARNER & COMPANY, INC. • NEW YORK • ST. LOUIS

When Biliary Secretion Must be Augmented

Hydrocholeresis—an increased flow of thin liver bile—is an important weapon in the treatment of many hepatobiliary affections. In noncalculous cholangitis, inspissated bile, mucus, pus, and debris are dislodged and removed by this mechanism. In biliary stasis, liver engorgement is reduced. Postoperatively, hydrocholeresis is employed in conjunction with antispasmodics for improving drainage and for disposal of debris and small common duct stones overlooked at surgery.

Decholin — chemically pure dehydrocholic acid — has long been a preferred hydrocholeretic agent. It augments biliary flow as much as 200 per cent, resulting in a copious flow of thin bile under pressure. Thus it provides a flushing action within the intrahepatic and extrahepatic biliary passages, effectively promoting drainage of the entire tract. Decholin is contraindicated only in complete obstruction of the common or the hepatic bile duct.

Supplied in boxes of
25, 100, 500, and 1000 3¾ gr. tablets.

Riedel-de Haen, New York 13, N. Y.

DIVISION OF AMES COMPANY, INC.

ACCEPTED AMERICAN MEDICAL ASSN

COUNCIL ACCEPTED SINCE 1932

Decholin

REG. U.S. PAT. OFF.

PACE-MAKER OF BILE ACID THERAPY

Benzedrine Inhaler, N.N.R.
"... is quite effective in the clearing of nasal congestion due to allergy or infection"

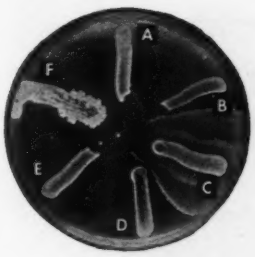
Feinberg, S. M.: Allergy in Practice, Chicago, The Year Book Publishers, Inc., 1944, p. 502.

Your hay fever patients will be grateful...particularly between office visits...for the relief of nasal congestion afforded by Benzedrine Inhaler, N. N. R.
The Inhaler may make all the difference between weeks of acute misery and weeks of comparative comfort.

Each Benzedrine Inhaler is packed with racemic amphetamine, S. K. F., 250 mg.; menthol, 12.5 mg.; and aromatics.

Benzedrine Inhaler
a better means of nasal medication

Smith, Kline & French Laboratories, Philadelphia, Pa.



0

0.1

0.4

Antibacterial Activity of STREPTOMYCIN

KEY TO PHOTOGRAPHS: • A. *Escherichia coli*
B. *Eberthella typhosa* • C. *B. proteus* • D. *Klebsiella pneumoniae*
E. *Bacillus pyocyaneus* • F. *Mycobacterium tuberculosis*
The numerals indicate micrograms of Streptomycin per cc. of agar.

1.6

6.4

26.

104.

THESE photographs show the inhibitory action of increasing concentrations of Streptomycin on a strain of six representative organisms *in vitro*. Inhibitory levels of concentration vary significantly with different strains.

Streptomycin exhibits a wide range of antibacterial activity *in vitro* and *in vivo* against both gram-positive and gram-negative organisms. Clinical results do not necessarily parallel *in vitro* activity or therapeutic results in experimental animals.

In clinical practice, Streptomycin is especially interesting because of its effectiveness against susceptible gram-negative organisms. The most noteworthy results to date have been obtained in the infections listed at the right.

Our production of Streptomycin is being rapidly expanded. However, due to the present shortage, Streptomycin was placed on allocation by the Civilian Production Administration effective March 1, 1946. At present, civilian distribution may be authorized only by Dr. Chester Keefer, Evans Memorial Hospital, Boston, Mass., Chairman of the Committee on Chemotherapeutics and Other Agents of the National Research Council.

URINARY TRACT INFECTIONS
due to susceptible
gram-negative organisms

TULAREMIA

MENINGITIS
due to *Hemophilus influenzae*

WOUND INFECTIONS
due to susceptible
gram-negative organisms

MERCK & CO., Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

Demerol hydrochloride, administered from thirty to ninety minutes preoperatively, relieves much of the surgical patient's apprehension and reduces the amount of anesthetic agent required to obtain a given depth of narcosis. The average preoperative dose for adults is 100 mg. injected intramuscularly, which may be combined with scopolamine or a barbiturate to assure amnesia.

Compared with morphine, Demerol causes considerably less nausea and vomiting, and the danger of respiratory depression is greatly reduced. Unlike morphine, Demerol does not interfere with the cough reflex or the reflexes and size of the pupil. It does not cause constipation, and urinary retention is less than with morphine.

Postoperatively, Demerol is a reliable analgesic in the majority of cases, regardless of the type of surgery or the severity of pain. Patients in the older age group, in particular, respond most favorably to this drug. The average postoperative dose for adults varies from 50 to 100 mg., administered by intramuscular injection or by mouth.

Demerol

Trademark Reg. U. S. Pat. Off. & Canada

HYDROCHLORIDE

Brand of Meperidine Hydrochloride (Isonipecaine)

Synthetic ANALGESIC • SPASMOLYTIC • SEDATIVE

Available *for injection*, ampuls of 2 cc. (100 mg.), in boxes of 6, 25 and 100; also vials of 30 cc. (50 mg. per cubic centimeter). *For oral use* in tablets of 50 mg., bottles of 25, 100 and 1000.

Subject to regulations of the Federal Bureau of Narcotics

WINTHROP

WRITE FOR DETAILED LITERATURE

Winthrop CHEMICAL COMPANY, INC.

Pharmaceuticals of merit for the physician • New York 13, N. Y. • Windsor, Ont.

SWOLLEN ANKLES!

"Swollen Ankles" is a common complaint. At times it is due to true cardiac or renal edema. Occasionally it is caused by strain or injury of the joints themselves. In a goodly number of cases there is no apparent etiologic factor and the disorder may be attributed to disorders of vascular permeability—and may be of allergic origin. Cases in these latter categories may be helped considerably by SUPRARENAL CONCENTRATE ARMOUR. This product is derived from the whole suprarenal gland. The epinephrine present naturally in the fresh glandular tissue has been removed to a mere trace and the connective tissue and other inert cellular structures eliminated. This permits the oral administration of adequate doses of suprarenal gland medication without pronounced gastric or intestinal discomfort.

In addition to its action on peripheral edema, SUPRARENAL CONCENTRATE ARMOUR has been found most effective in drying up the watery secretions of allergic rhinitis and hay fever. It should be given a trial in all coryza cases that are not purely infectious in origin.

The adult dose is two capsules three or four times daily until the desired effect is obtained, then reduced to the required maintenance dose—usually one capsule t. i. d.

Available in 2 grain capsules in bottles of 100.

ARMOUR *Suprarenal Concentrate*

Have confidence in the preparation you prescribe—specify "ARMOUR"

THE *Armour* LABORATORIES

HEADQUARTERS FOR MEDICINALS OF ANIMAL ORIGIN • CHICAGO, 9 ILLINOIS

Number 5 of a Series

ANEMIAS OF CHILDHOOD

Nutritional anemia
Idiopathic seborrhea
von Jaksch's syndrome

— the combination of ferrous iron, unfractionated liver and B vitamins effects a more powerful hemopoietic action than any form of iron alone —

HEPATINIC

—particularly suited for administration to children because of its pleasant flavor and easy administration— contains (per fluidounce): Ferrous sulfate 12 gr., Crude Liver Concentrate 60 gr., fortified to represent Thiamine Hydrochloride 2 mg., Riboflavin 4 mg., Niacinamide 20 mg., together with pyridoxine, pantothenic acid, choline, folic acid, vitamin B_{10}, vitamin B_{11}, biotin, inositol, para-aminobenzoic acid and other factors of the vitamin B complex as found in crude (unfractionated) liver concentrate.

The value of the crude (unfractionated) liver concentrate in Hepatinic is of the highest order, for all the erythropoietic principles are retained. In addition, this unique liver is subjected to a special enzymatic digestion process which converts it to a most readily assimilable form.

Tasting samples are available to all physicians upon request.

Elixir Hepatinic is supplied in bottles of one pint and one gallon

McNEIL

LABORATORIES, INC., PHILADELPHIA 32, PENNSYLVANIA

Now

PENICILLIN CALCIUM tablets – *Schering*

Schering's PENICILLIN CALCIUM TABLET contains 25,000 Oxford Units buffered with *0.3 Gm.* sodium citrate. This small quantity of buffer has been shown to produce penicillin blood levels identical with those obtained when almost twice as much buffer is provided.

Current practice is to employ oral penicillin in the treatment of less severe infections caused by the more penicillin-sensitive organisms, and where experience with parenteral therapy has shown that this antibiotic will not be required for prolonged and intensive therapy. Oral penicillin should be administered in a ratio of 5:1 to obtain blood levels comparable to those achieved with intramuscular injection.

PACKAGING: PENICILLIN CALCIUM TABLETS—SCHERING are packaged twelve tablets per box, each tablet hermetically sealed in metal foil.

Schering CORPORATION · BLOOMFIELD, N. J.

IN CANADA, SCHERING CORPORATION LIMITED, MONTREAL

Digitaline Nativelle

REG. U. S. PAT. OFF.

The Original Digitoxin

•

The Most Highly Purified Digitoxin Available

•

Council Accepted

Advantages

- The chief active glycoside of Digitalis purpurea in pure crystalline form.
- Dependable uniformity in potency. Permits dosage to be calculated in terms of weight of drug.
- Completely and readily absorbed by the gastrointestinal tract, making for greater accuracy in therapy.
- Virtual freedom from locally induced nausea and vomiting.
- Complete digitalization in 6 to 10 hours *on oral administration.*
- No different instructions needed for patient —maintenance dosage is one tablet daily, usually 0.1 mg. suffices.
- Margin of safety at least as wide as with whole digitalis leaf.
- The most economical digitoxin for the patient.

How Supplied

Digitaline Nativelle is available through all pharmacies in 0.1 mg. tablets (pink) and 0.2 mg. tablets (white) in bottles of 40 and 250, and in ampules of 0.2 mg. (1 cc.) and 0.4 mg. (2 cc.) in packages of 6 ampules and 50 ampules.

Physicians are invited to send for samples, literature, and a copy of the brochure "Management of the Failing Heart."

ACCEPTED AMERICAN MEDICAL ASSN.

VARICK PHARMACAL COMPANY, INC.

A Division of E. Fougera & Co., Inc.

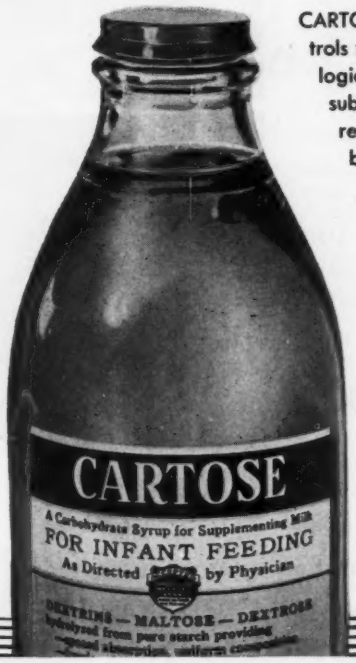
75 Varick Street, New York 13, N. Y.

CARTOSE* is prepared especially for use in modifying milk for feeding infants. It provides definite proportions of nonfermentable high dextrins, maltose and dextrose.

CARTOSE permits flexibility in formula writing which is desired by physicians. Its mixed carbohydrates favor the spaced absorption held to be advantageous in infant nutrition.

CARTOSE is manufactured under process controls which assure a high standard of bacteriological purity and freedom from foreign substances. It is packed in a container which reduces the possibility of contamination after the bottle has been opened.

Gastrointestinal disturbances are minimized when CARTOSE is used as a milk modifier.



CARTOSE

Reg. U. S. Pat. Off.

MIXED CARBOHYDRATES

Two tablespoonfuls (approximately one ounce) of CARTOSE provide 120 calories.

Supplied in clear glass bottles containing one pint.

Available through all pharmacies.

Samples and literature will be sent to physicians upon request.

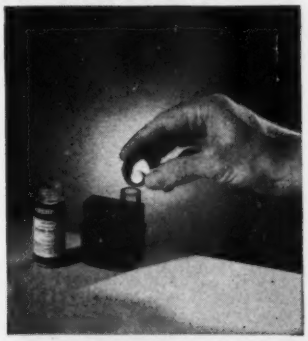
H. W. KINNEY & SONS, INC.
COLUMBUS • INDIANA

Kinney

* registered trademark of H. W. Kinney & Sons, Inc.

THE TABLET METHOD FOR DETECTING URINE-SUGAR

CLINITEST



Simply drop one Clinitest Tablet into test tube containing proper amount of diluted urine. Allow time for reaction, compare with color scale.

ELIMINATES—*Use of flame*
Bulky apparatus
Measuring of reagents

PROVIDES— *Simplicity*
Speed
Convenience of technic

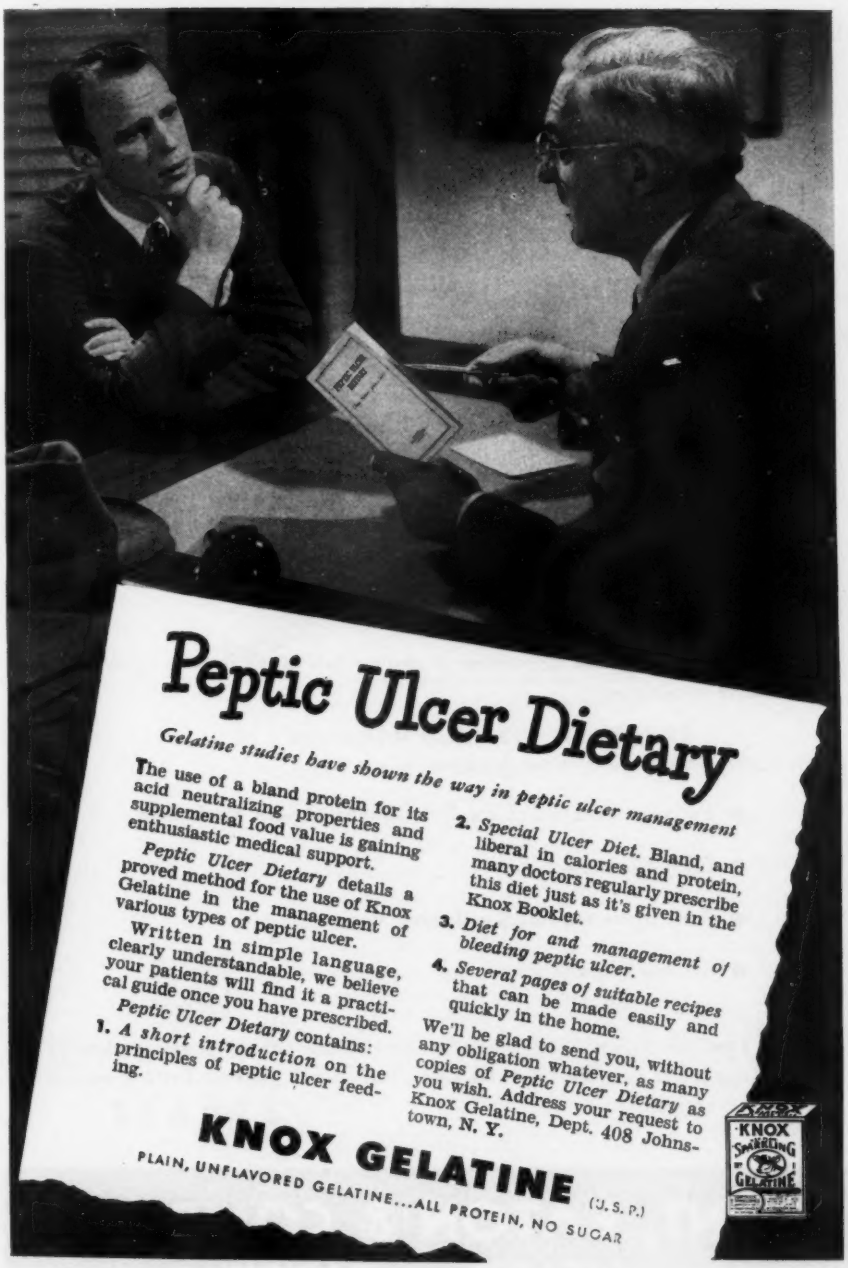
FOR OFFICE USE—*Clinitest Laboratory Outfit* (*No. 2108*) Includes—Tablets for 180 tests, test tubes, rack, droppers, color scale, instructions. Additional tablets can be purchased as required.

FOR PATIENT USE—*Clinitest Plastic Pocket-Size Set* (*No. 2106*) Includes—All essentials for testing—in a small, durable, pocket-size case of Tenite plastic.

ORDER FROM YOUR DEALER

Information upon request

AMES COMPANY, Inc. • Elkhart, Indiana



Peptic Ulcer Dietary

Gelatine studies have shown the way in peptic ulcer management

The use of a bland protein for its acid neutralizing properties and supplemental food value is gaining enthusiastic medical support.

Peptic Ulcer Dietary details a proved method for the use of Knox Gelatine in the management of various types of peptic ulcer.

Written in simple language, clearly understandable, we believe your patients will find it a practical guide once you have prescribed.

Peptic Ulcer Dietary contains:

1. *A short introduction* on the principles of peptic ulcer feeding.
2. *Special Ulcer Diet.* Bland, and liberal in calories and protein, many doctors regularly prescribe this diet just as it's given in the Knox Booklet.
3. *Diet for and management of bleeding peptic ulcer.*
4. *Several pages of suitable recipes* that can be made easily and quickly in the home.

We'll be glad to send you, without any obligation whatever, as many copies of *Peptic Ulcer Dietary* as you wish. Address your request to Knox Gelatine, Dept. 408 Johnstown, N. Y.

KNOX GELATINE (U. S. P.)

PLAIN, UNFLAVORED GELATINE...ALL PROTEIN, NO SUGAR

CHOLINE
THE LIPOTROPIC FACTOR

Now available in the potent, **pleasant-tasting** form of

SYRUP CHOLINE DIHYDROGEN CITRATE
(Flint)

Choline prevents abnormal deposition of neutral fats in the liver in many toxic and degenerative syndromes.

Clinical and laboratory evidence suggests its use in

- **Fatty infiltrations of the liver associated with alcoholism**
- **Early Cirrhosis**
- **Fatty livers associated with toxic states**
- **Related Hepatic Syndromes**

Pleasant Tasting—Syrup Choline Dihydrogen Citrate (Flint) is easily taken by the patient. Supplied in one pint (16 fluidounce) bottles and gallons. Tasting sample and literature on request.

FLINT, EATON & COMPANY
DECATUR • ILLINOIS

NEW SEARLE AMINOPHYLLIN SUPPOSITORIES

For more convenient and effective rectal administration of Aminophyllin,* Searle Research has produced

AMINOPHYLLIN SUPPOSICONES

(SEARLE BRAND OF AMINOPHYLLIN SUPPOSITORIES)

Differing from all other types of suppositories, Searle Aminophyllin Supposicones are molded with a new base material which liquefies rapidly in the rectum, permitting complete absorption of the Aminophyllin, but which remains *stable and solid at temperatures up to 130° F. outside the body.*

Searle Aminophyllin Supposicones are non-irritating to the rectal mucosa—require no anesthetic—are of proper size and shape for easy insertion and retention. Each Aminophyllin Supposicone contains 500 mg. (7½ grs.) Searle Aminophyllin. Packaged in boxes of 12.

ACCEPTED AMERICAN MEDICAL ASSN

*Searle Aminophyllin contains at least 80% of anhydrous theophyllin

Supposicones is the registered trademark of G. D. Searle & Co., Chicago 80, Illinois

SEARLE

RESEARCH IN THE SERVICE OF MEDICINE

Cost Less

THAN TOWEL SERVICE...

Adaptable

TO MANY USES

J & J Professional Towels provide individual service appreciated by the patient. Made with "Masslinn*", the unique non-woven cotton fabric developed by Johnson & Johnson, they are amazingly soft and absorbent. Economical too—use once, then throw away—no laundry bills.

TYPICAL PROFESSIONAL USES:

- *Hand Towel.*
- *On examining tables and instrument trays.*
- *Wiping instruments after use.*
- *Wrapping instruments for sterilization.*
- *To remove ointments or pastes.*
- *To protect patients' clothing during eye, ear, nose or throat work.*
- *On baby scales.*
- *Beneath arm during phlebotomy.*
- *Colostomy dressings.*

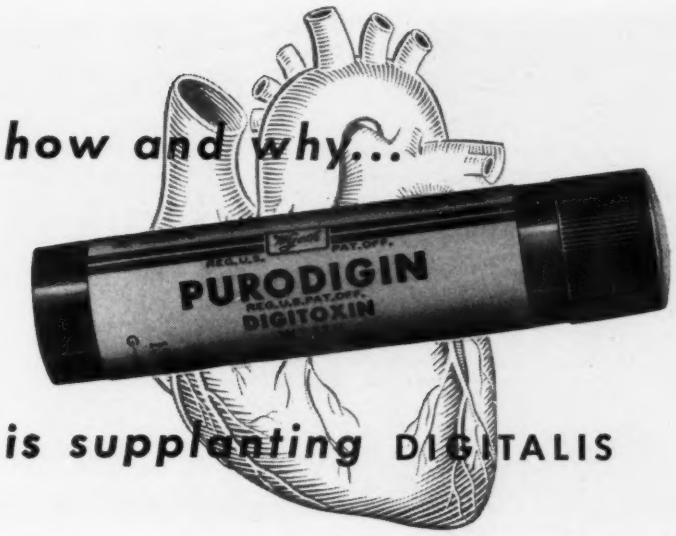
ORDER FROM YOUR DEALER

Johnson & Johnson
NEW BRUNSWICK, N. J. CHICAGO, ILL.

DISPOSABLE
PROFESSIONAL
TOWELS

Free Samples Upon Request. Write today.

*Trade-mark



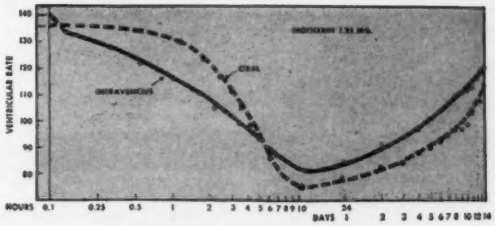
The average maintenance dose of Purodigin is 0.1-0.2 mg.

The average maintenance dose of digitalis is 0.1-0.2 Gm. (1.5-3 gr., or 1-2 U. S. P. units).

The patient on digitalis can be changed to Purodigin merely by substituting 0.1-0.2 mg. Purodigin for 0.1-0.2 Gm. digitalis.

Purodigin is identical with digitalis in therapeutic effect, rate of cumulation and rate of excretion.

Purodigin has the advantage of constant potency and complete absorption—it differs from digitalis in that it contains no unabsorbable or non-therapeutic components to irritate the gastrointestinal tract.



PURODIGIN

REG. U. S. PAT. OFF.

DIGITOXIN WYETH

0.2 mg. tablets, vials of 30 and bottles of 100 • 0.1 mg. tablets, bottles of 100

***New!* For intravenous injection: 1 cc. ampuls—Boxes of 6**

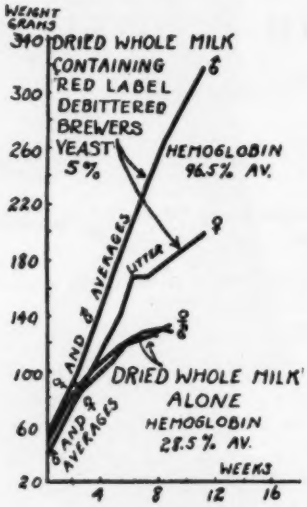
WYETH INCORPORATED Wyeth PHILADELPHIA 3, PA.

REG. U.S. PAT. OFF.

VITAMIN FOOD COMPANY

DRIED BREWERS YEAST AND WHOLE MILK

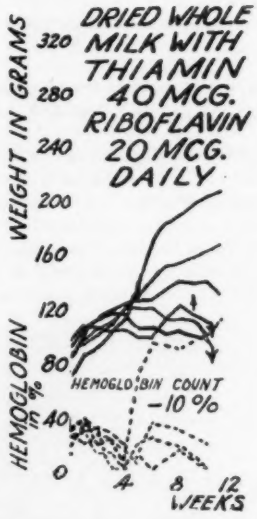
The important discovery of the nutritional value of Whole Milk and Dried Brewers Yeast, with its wide need in child and adult nutrition, brought a distinct vitamin and other food aid to physicians.



A teaspoon (5 grams) is more than 5% of solids in a pint of whole milk.

Daily indicated are ¼ teaspoon in bottle formula, ½ teaspoon children to 12 years; adults 1 teaspoon, or as prescribed.

Use in water, milk, soup, cereals.



Whole milk and these additions do not supplement each other.

Vitamin Food Company supplies Red Label, Debittered; Green Label, Undebittered, Dried Brewers Yeast. The Green Label is more largely used in pellagra; minimum 2 teaspoons 3 times daily.

Samples to physicians and hospitals

VITAMIN FOOD COMPANY, INC.
Vitamin Research Laboratories, Inc.

187 Sylvan Avenue **Newark 4, N. J.**

MANDELAMINE

Reg. U. S. Pat. Off.
(Methenamine Mandelate)

IS AN ESPECIALLY EFFECTIVE URINARY ANTISEPTIC

Safety, ease of administration, and characteristically prompt action combine to make Mandelamine an especially efficient agent in the treatment of urinary infections in children and in elderly patients.

Freedom from drug toxicity is an important consideration to the busy physician who is unable to maintain patients under close medical supervision. Mandelamine may be confidently prescribed in therapeutic dosage virtually without consideration of toxic effects.

Uncomplicated oral administration of Mandelamine requires no supplementary acidification, restriction of fluid intake, dietary control, or other special measures. Only in those infections due to urea-splitting organisms, may accessory acidification be necessary.

Early control of common urinary infections is the characteristic response to Mandelamine therapy. Disturbing urinary symptoms are usually alleviated rapidly and, in the absence of obstruction, the urine is promptly cleared of organisms in a high percentage of cases.

Mandelamine is supplied in enteric coated tablets of 0.25 Gm. (3¾ grains) each, in packages of 120 tablets sanitaped, and in bottles of 500 and 1000.

NEPERA CHEMICAL CO. INC.
21 Gray Oaks Ave.
Yonkers 2, New York
Please send me literature, and a physician's sample of Mandelamine.

Name.....M.D.

Street.....

City.....State.....

NEPERA CHEMICAL CO. INC.

Manufacturing Chemists Yonkers 2, New York

new! improved treatment

for *coryza*
sinusitis
rhinitis
nasal congestion

'PROTHRICIN'

antibiotic nasal decongestant

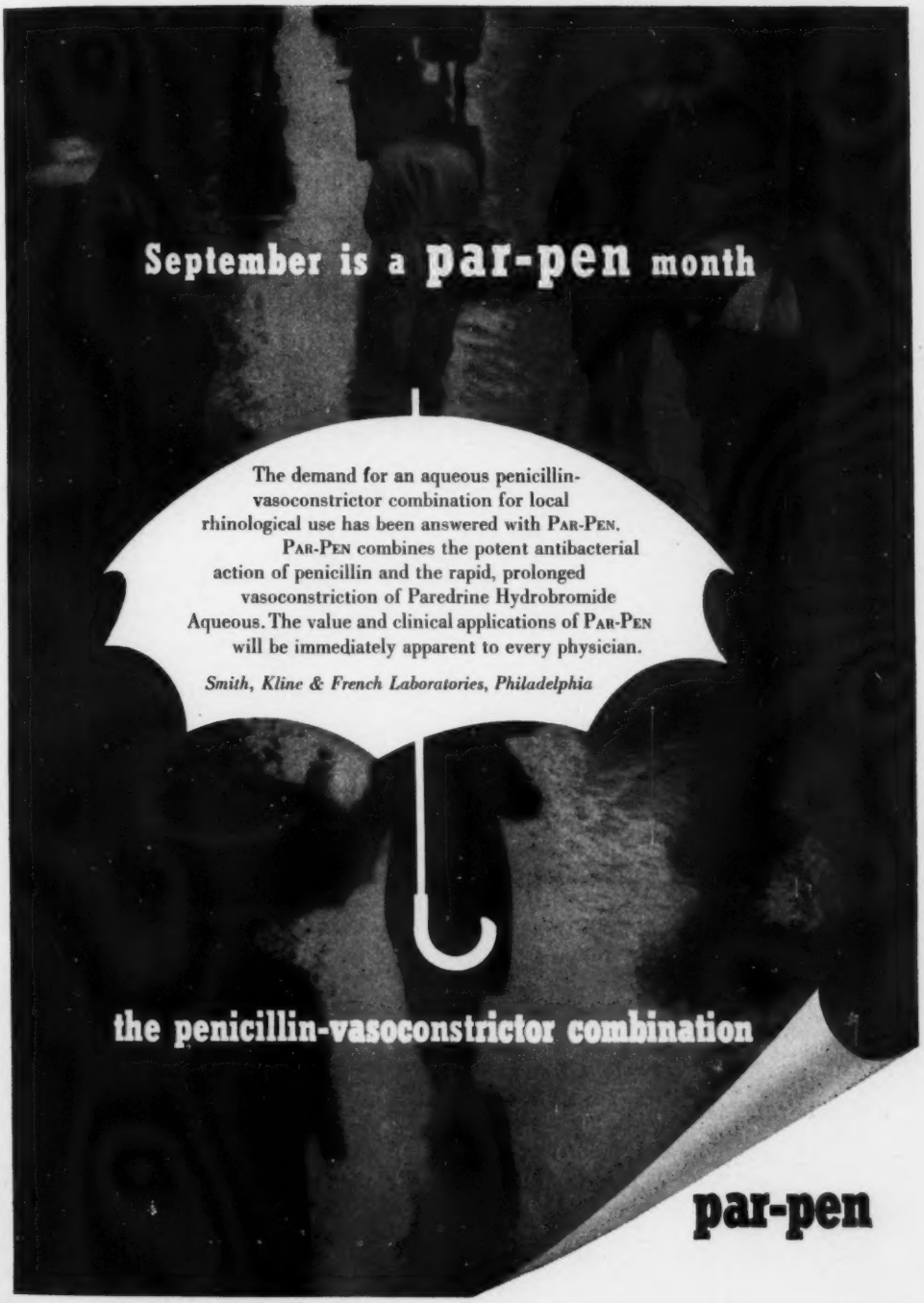
because:

1. 'PROTHRICIN' decongestant contains *tyrothricin* (0.02%), potent, nontoxic topical antibiotic with wider antibacterial scope than the sulfonamides; quicker, more prolonged local antibiotic action than penicillin; low surface tension; greater permeability and stability than penicillin.
2. 'PROTHRICIN' decongestant maintains its antibacterial efficiency even in the presence of pus and mucus.
3. 'PROTHRICIN' decongestant serves to re-establish normal intranasal function since it is isotonic, with a buffered pH of 5.5-6.5, does not impair normal intranasal physiologic processes, and does not interfere with ciliary activity.
4. 'PROTHRICIN' decongestant is clear and free-flowing, unlike intranasal sulfonamide suspensions, and does not form mucosal crusts that may block drainage.
5. 'PROTHRICIN' Antibiotic Nasal Decongestant also contains 'Propadrine' hydrochloride (1.5%), a highly efficient vasoconstrictor, notably free from undesirable side-effects of ephedrine and its analogs.

SHARP & DOHME

Supplied in 1-ounce bottles with dropper assembly

SHARP & DOHME, PHILADELPHIA 1, PA.


September is a par-pen month
The demand for an aqueous penicillin-vasoconstrictor combination for local rhinological use has been answered with PAR-PEN. PAR-PEN combines the potent antibacterial action of penicillin and the rapid, prolonged vasoconstriction of Paredrine Hydrobromide Aqueous. The value and clinical applications of PAR-PEN will be immediately apparent to every physician.
Smith, Kline & French Laboratories, Philadelphia
the penicillin-vasoconstrictor combination
par-pen

Clinical manifestation of st

Supplied in bottles of 50, 100 and 500 capsules.
Parenteral for supplementary intramuscular injection.

ETHICALLY PROMOTED
Ertron is the registered trademark of Nutrition Research Laboratories

steroid therapy in arthritis

CLINICALLY DISTINCTIVE

In the subjective and objective response of the arthritic patient to Ertron therapy, the clinician can observe the practical effects of an interesting and vital phenomenon of steroid chemistry.

The findings of various investigators indicate that beneficial effects of Ertron are due to its systemic action. The Ertronized patient first notices a distinct feeling of well-being. This is followed in a large proportion of patients by a recession of pain, diminution of soft-tissue swelling, increased mobility of the affected joints, improvement of function and resistance to fatigue. The arthritic is enabled to increase his daily activities or to better withstand the surgical procedures of orthopedic restoration.

CHEMICALLY DIFFERENT

Laboratory studies over a five year period prove that Ertron—Steroid Complex, Whittier —contains a number of hitherto unrecognized factors which are members of the steroid group. The isolation and identification of these substances in pure form establish the chemical uniqueness of Ertron and its steroid complex characteristics. Each capsule of Ertron contains 5 milligrams of activation-products. Biologically standardized to an antirachitic activity of fifty thousand U.S.P. Units.

Physician control of the arthritic patient is essential for optimum results. Ertron is available only upon the prescription of a physician.

NUTRITION RESEARCH LABORATORIES • CHICAGO

ROUNDING OUT A STELLAR PERFORMANCE IN ERYTHROPOIESIS

Ascorbic acid is included in the formula of this comprehensive hematopoietic agent because of its demonstrated ability to (1) increase the absorption of iron[1,2], (2) affect the formation of blood[3,4], and (3) correct vitamin C deficiencies so frequently concomitant with hypochromic anemias[5,6]. Also present in Endoglobin-C is ferrous iron (best absorbed, most easily tolerated) ... secondary fraction of liver (to enhance production of hemoglobin) ... and three essential B vitamins (to improve general nutritional status and promote utilization of iron).

REFERENCES: (1) Henderson, V. E. and Lucas, G. H. W.: Am. J. Dig. Dis. 11:244, 1944; (2) Liu, S. H., et al.: Proc. Soc. Exp. Biol. Med. 46:603, 1941; (3) Bicknell, F. and Prescott, F.: The Vitamins in Medicine, p. 474-476, 1946; (4) Tocantins, L. M.: in Duncan's Diseases of Metabolism, p. 356, 1942; (5) Dunlap, D. M. and Scarborough, H.: Edinburgh M. J. 42:476, 1935; (6) Israels, M. C. C.: Lancet 1:170, 1943.

FORMULA: Each ENDOGLOBIN-C tablet contains: Liver Residue, 0.2 Gm. (secondary fraction 50:1 derived from 10 Gm. fresh liver); Ferrous Sulfate Exsiccated U.S.P., 0.2 Gm.; Thiamine Hydrochloride, 1 mg.; Riboflavin, 0.66 mg.; Niacin, 10 mg.; Ascorbic Acid, 50 mg.

SUPPLIED: In bottles of 100, 500 and 1000 yellow-coated tablets. Endoglobin Tablets (without Vitamin C) are also available.

ENDO ENDOGLOBIN-C

ENDO PRODUCTS INC. • RICHMOND HILL 18, N.Y.

HYDROSULPHOSOL

opens a new chapter in Sulfur Therapy

Dramatic results confirm its value in burns, arthritis, and many conditions in which sulfur imbalance is a clinical factor.

Recommended uses as a home or adjunctive hospital treatment in arthritis—

FOOT BATH: Add one ounce of Hydrosulphosol Solution to a large galvanized bucket or container ample in size to immerse both feet and ankles. The water should be about 100 deg. F. at first or a temperature that can be comfortably tolerated. The temperature of such a bath can be gradually raised to 105 deg. F. if this heat can be tolerated. This type bath can be employed also for the arms. Length of bath 20 to 40 minutes.

TUB BATH: Add two ounces of Hydrosulphosol Solution to a full tub of water at 100 to 102 deg. F. for five to twenty minutes with a patient moving all of his affected joints while submerged in the bath. An authority on this type of therapy points out the hot bath is useful in subacute or chronic generalized rheumatoid arthritis, although some arthritic patients, particularly those who are emaciated and weakened, do not tolerate exposure to heat and are easily exhausted from prolonged hot baths. In such cases the foot bath would be better indicated.

Fluids should be given freely after the bath (or during the bath if marked sweating occurs). If there is excessive perspiration, 2 to 6 tablets of sodium chloride (1 Gm. each) may be given. All patients should rest in bed for at least an hour after the bath.

ORAL: 10 to 15 drops of Hydrosulphosol Solution to a glass of water at least three time a day. If initial dosage appears to cause discomfort due to sulfur odor or taste fewer drops can be added to each glass of water until larger amounts can be tolerated easily and without distaste.

OINTMENT: Rub Hydrosulphosol Ointment over stiff joints, dry skin or affected areas once or twice daily.

No evidence of toxicity has been reported during the 10 years of experimental study.

JUST OFF THE PRESS

Write for this new brochure presenting rationale and data descriptive of the product and its uses.

Your name will be filed to receive reprints of reports on clinical and laboratory studies now being conducted by eminent investigators.

Reprints of published literature on request

R D

Rees-Davis Drugs, Inc.
MERIDEN, CONNECTICUT

To some patients...

the esthetic advantages of
Lorophyn Suppositories will appeal

For others... the simplicity

of the Lorophyn Suppository
technic is advisable

But **all** physicians will appreciate the demonstrated clinical effectiveness of...

Lorophyn suppositories

FOR CONCEPTION CONTROL

Lorophyn Suppositories are hermetically sealed in foil. They melt rapidly after insertion to form a tenacious, viscous emulsion over the cervix, to impede entrance of spermatozoa. This barrier film liberates one of the most powerful, rapidly acting of spermicides, phenylmercuric acetate.

Tests prove that even when diluted, Lorophyn Suppositories kill sperm rapidly.

EATON Laboratories Inc.
NORWICH, NEW YORK

CHLOROPHYLL THERAPY

Proved in the laboratory! Proved in the clinic!
NOW PROVED IN PRACTICE!

Chloresium

REG. U.S. PAT. OFF.

The natural nontoxic healing agent containing the water-soluble derivatives of chlorophyll . . . For the treatment of wounds, burns, ulcerative conditions.

1. **Accelerates healing**
2. **Stimulates normal cell growth**
3. **Reduces scar formation**
4. **Controls infection**
5. **Is nontoxic—bland and soothing**
6. **Deodorizes malodorous lesions**

During the past five years, exhaustive laboratory and clinical research has shown that the water-soluble derivatives of chlorophyll "a" contained in Chloresium measurably accelerate the healing of wounds, burns, ulcers and similar lesions, especially those of the chronic, indolent and resistant types. In addition, Chloresium was shown to promptly eliminate the almost unbearable odors associated with suppurative conditions such as ulcerative carcinoma, chronic osteomyelitis, leg ulcers and similar malodorous cases.

Now—proved in general practice

The response of the medical profession to Chloresium since its introduction last October has been most gratifying. In one recent month, over five thousand requests for literature were received. A steady volume of re-orders from hospitals and pharmacists is conclusive proof that physicians have found in Chloresium an important new therapy for healing and deodorizing.

If you have not used Chloresium, send the coupon. The results which it can achieve are the best evidence of what Chloresium can do.

Chloresium is ethically promoted.
Available at all leading druggists.

CHLORESIUM SOLUTION (PLAIN) . 2-oz. and 8-oz. bottles
CHLORESIUM OINTMENT . . . . 1-oz. tubes and 4-oz. jars
CHLORESIUM NASAL SOLUTION . . ½-oz. dropper bottles and 2-oz. and 8-oz. bottles

Both CHLORESIUM SOLUTION (PLAIN) and CHLORESIUM OINTMENT contain the purified, therapeutically active *water-soluble* derivatives of chlorophyll "a" ($C_{55}H_{72}O_5N_4Mg$). They are maintained to rigid chemical and physical standards and are pharmaceutically adjusted to a low surface tension to insure penetrability . . . CHLORESIUM NASAL SOLUTION contains these same *water-soluble* chlorophyll derivatives in an isotonic saline solution suitably buffered for nasal instillation. Indicated for symptomatic relief and for acceleration of healing of acute and chronic inflammatory conditions of the upper respiratory tract.

RYSTAN COMPANY
50 CHURCH ST., NEW YORK 7, N.Y.

Sole Licensee—Lakeland Foundation

FREE—mail coupon for literature and sample

RYSTAN COMPANY, Dept. SM-4
50 Church St., New York 7, N. Y.

Please send me, without obligation, "Chlorophyll—Its Use in Medicine," a review of over 60 published papers, with explicit directions for the use of Chloresium therapy—and sample of the products indicated: ( ) Chloresium Solution (Plain): ( ) Chloresium Ointment: ( ) Chloresium Nasal Solution.

*Name*_____ *M.D.*

*Street*_____

*City*_____ *State*_____

Acceptable

AT EVERY SEASON

Taken cold during the summer months or hot during the wintertime, the delicious food drink made by mixing Ovaltine with milk provides a wealth of essential nutrients in readily digested and assimilated form. Its delicious taste makes it enjoyable at every season. As a supplement to an inadequate diet, in the correction of the milder forms of malnutrition, or when the intake of all essential nutrients must be augmented, it makes a worth-while contribution, as indicated by its balanced composition shown in the table below. This dietary supplement provides biologically adequate protein, readily utilized carbohydrate, highly emulsified fat, ascorbic acid, B complex and other vitamins, and the essential minerals calcium, phosphorus, iron and copper. Its low curd tension makes for rapid gastric emptying and easy digestibility. It is relished by both children and adults, and is unusually acceptable either as a mealtime beverage or with between meal snacks.

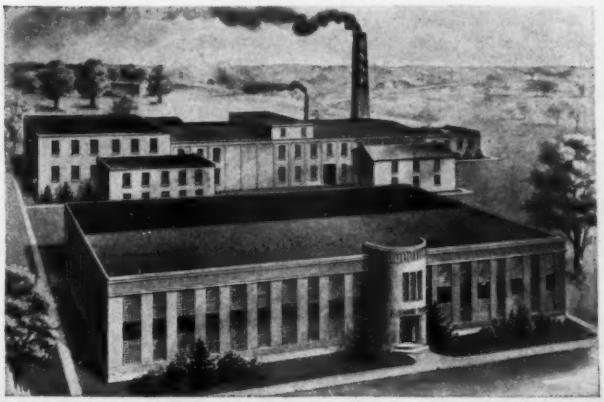
THE WANDER COMPANY, 360 NORTH MICHIGAN AVENUE, CHICAGO 1, ILL.

Ovaltine

Three servings daily of Ovaltine, each made of ½ oz. of Ovaltine and 8 oz. of whole milk,* provide:

CALORIES	669	*VITAMIN A	3000 I.U.
PROTEIN	32.1 Gm.	VITAMIN B_1	1.16 mg.
FAT	31.5 Gm.	RIBOFLAVIN	1.50 mg.
CARBOHYDRATE	64.8 Gm.	NIACIN	6.81 mg.
CALCIUM	1.12 Gm.	VITAMIN C	39.6 mg.
PHOSPHORUS	0.939 Gm.	VITAMIN D	417 I.U.
IRON	12.0 mg.	COPPER	0.50 mg.

*Based on average reported values for milk.



REALISTIC UTILITY

Not only because of *how* they are produced, but in *what* is produced, U. S. Standard Products are proving of significant value in meeting the problems of both general and specialized practice.

Held unvaryingly to standards of potency which have earned for them wide recognition for dependability, the physician finds in the U. S. Standard Products list of fine pharmaceuticals a selection of wide scope and usefulness.

Aiming always at realistic utility, deviating from the traditional in order to progress, products are made available to meet *unusual* requirements—yet the old and time-tested are not left behind in the swift rush of the merely novel.

Increasingly, the medical profession is finding in U. S. Standard Products fine preparations suited with singular aptness to their needs.

OUTSTANDING U. S. STANDARD BIOLOGICALS:

DIPHTHERIA TOXOID • TETANUS ANTITOXIN • SMALLPOX VACCINE • TYPHOID VACCINE

Also a representative list of glandular products and pharmaceuticals.

U. S. STANDARD PRODUCTS CO.

WOODWORTH, WISCONSIN, U. S. A.

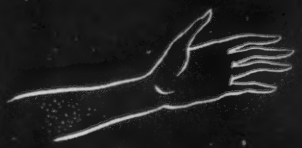
SOLFOTON

Nerve tension expresses itself in a variety of ways—sometimes externally through the hands—more often internally by such dysfunctions as rapid or irritable heart action, wakefulness, and moderate rise in blood pressure.

Solfoton is remarkably effective in relieving such tension by providing an even, mild sedation, and by improving the detoxication of excitant amines and phenols. Each Solfoton tablet contains 1/4 grain phenobarbital and 1/3 grain of a unique colloidal sulfur. Dosage is one tablet four times a day, for at least two weeks. Solfoton is manufactured by the William P. Poythress & Company, Richmond Virginia.

A NEW, YET **PROVEN** WEAPON FOR THE CONTROL OF **allergies**

HAY FEVER



URTICARIA

ASTHMA

Ciba announces Pyribenzamine, a synthetic chemical with marked capacity to antagonize the actions of histamine. Thus it is useful in the prevention and relief of anaphylaxis and many forms of allergy.

Laboratory work followed by extensive clinical evidence has led to the release of Pyribenzamine with assurance of its efficacy in a majority of cases.

In its three primary indications—**Hay Fever, seasonal Asthma** and **Urticaria**—Pyribenzamine affords marked symptomatic relief.

At present available in limited quantities, Pyribenzamine is issued in tablets of 50 mg., in bottles of 50 and 500.

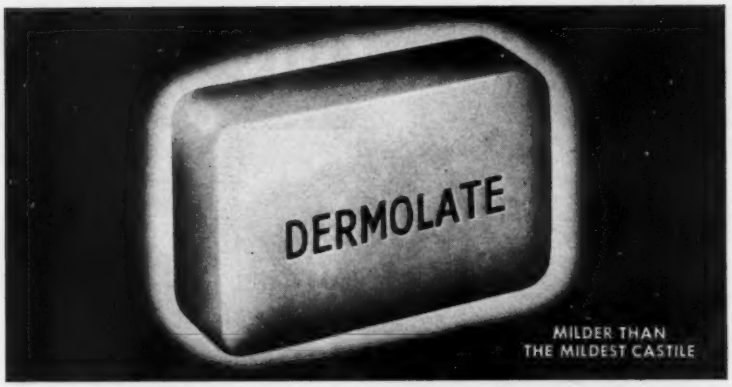
Literature on Pyribenzamine may be obtained by writing the Professional Service Department.

Pyribenzamine—Trade Mark Applied For

PYRIBENZAMINE

CIBA

CIBA PHARMACEUTICAL PRODUCTS, INC. • SUMMIT, NEW JERSEY



NEW *Logical companion product to* **ACIDOLATE,** *the non-lathering sulfated-oil skin detergent*

Like a vanishing cream in cake form, but with lathering and detergent qualities

It is an established principle[1] that only the high-molecular-weight saturated, or properly substituted fatty acids are non-irritating in the presence of alkali. Vanishing creams, which conform to this scientific concept, are virtually non-irritating. However, since they do not possess detergent qualities, they are not satisfactory skin cleansers.

Dermolate, retaining the non-irritating characteristics of vanishing creams, adds lather and excellent cleansing properties. It is a mixture of high-molecular-weight sulfato-octadecanoic acid, stearic acid, and the sodium salts of these preponderantly saturated fatty acids.

Castile soap, though relatively mild, contains a preponderance of high-molecular-weight *un*saturated fatty acids, which have been shown to be more irritating than the high-molecular-weight saturated fatty acids.

Like Acidolate, Dermolate maintains its detergent properties even when used with hard water. However, it has the psychological advantage of lathering and is more convenient for routine daily use.

Dermolate may be used at all ages for cleansing all skins, normal or pathologic. Especially valuable in *soap-irritable skins, contact dermatitis, infantile eczema, occupational dermatoses, surgical scrub-up, soap-aggravative lesions.*

1. I. H. Blank, Arch. of Derm. and Syph., 39: 811-824 (1939), May: "Action of Soap on Skin."

Obtainable from pharmacies in 4 oz. cakes
(Maximum $.35)

Write for professional sample

Distributed for
NATIONAL OIL PRODUCTS COMPANY by

RARE CHEMICALS, INC.
HARRISON, NEW JERSEY

West Coast Distributors:
GALEN COMPANY, Richmond, California
75J

DERMOLATE
TRADEMARK

a good supporting hand

in sulfonamide therapy is provided by 'ALKA-ZANE'* Alkaline Effervescent Compound. Administered in water, 'ALKA-ZANE' Alkaline Effervescent Compound helps maintain the degree of urinary alkalinity and high fluid intake essential to solubility of sulfonamides and their acetyl derivatives . . . for the prevention of crystalluria and obstruction of the kidneys and urinary tract.

'ALKA-ZANE' Alkaline Effervescent Compound makes a refreshing, effervescent drink which supplies the principal bases of the alkaline reserve, sodium, calcium and magnesium, as readily assimilable carbonates, citrates, and phosphates.

For additional pharmaceutical details consult your pharmacist—for more extensive medical data write Medical Division of William R. Warner & Co.

William R WARNER and Co. Inc. 113 WEST 18TH STREET, NEW YORK 11, N. Y.

'alka-zane'

Alkaline Effervescent Compound Bottles of 1½, 4 and 8 ounces.

*Trademark Reg. U. S. Pat. Off.

NEW...

NATURAL VITAMIN D

HIGHER POTENCIES, IMPROVED FORMULA

VI-SYNERAL VITAMIN DROPS

Now providing natural vitamin D from rich fish liver sources, and increased potencies of vitamins A and C... with pyridoxine and pantothenic acid added... Vi-Syneral Vitamin Drops is unexcelled as a multivitamin supplement for the infant's diet. NO INCREASE IN PRICE.

more than vitamins A and D alone

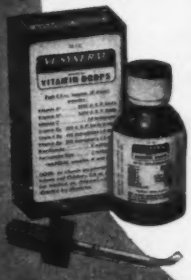
Each 0.6 cc. provides:

Vitamin A*	5000 U.S.P. Units
Vitamin D*	1000 U.S.P. Units
Ascorbic Acid (C)	50 mg.
Thiamine (B_1)	1 mg.
Riboflavin (B_2)	0.4 mg.
Pyridoxine (B_6)	0.1 mg.
Niacinamide	5 mg.
Pantothenic Acid	2 mg.

*Natural vitamins A and D

CONTAINS NO ALCOHOL

NEW IMPROVED FORMULA



In 15 cc. and 45 cc. packages with dosage marked dropper.

U. S. VITAMIN CORPORATION

250 East 43rd Street • New York 17, N. Y.

Write for sample and literature

This single monthly dose is more than just a convenience—it helps guarantee accurate dosage by parents who might ordinarily forget, or vary it from day to day.

Each capsule of Infron Pediatric contains 100,000 U.S.P. Units of vitamin D —Whittier Process—*especially prepared for pediatric use.*

Infron Pediatric is readily dispersible in the infant's feeding formula, milk, fruit juices, or water, and can also be mixed in cereal.

Infron Pediatric is economical—one package contains six monthly administrations, each in an easily opened capsule container.

REFERENCES

Rambar, A. C.; Hardy, L. M. and Fishbein, W. I.: J. Ped. 23:31-38 (July) 1943

Wolf, I. J.: J. Ped., 22:707-718 (June) 1943

Wolf, I. J.: J. Ped. 22:396-117 (April) 1943

Wolf, I. J.: J. Med. Soc. New Jersey, 38:436-440 (Sept.) 1941

ETHICALLY PROMOTED

Infron is the registered trademark of Nutrition Research Laboratories.

NUTRITION RESEARCH LABORATORIES · CHICAGO

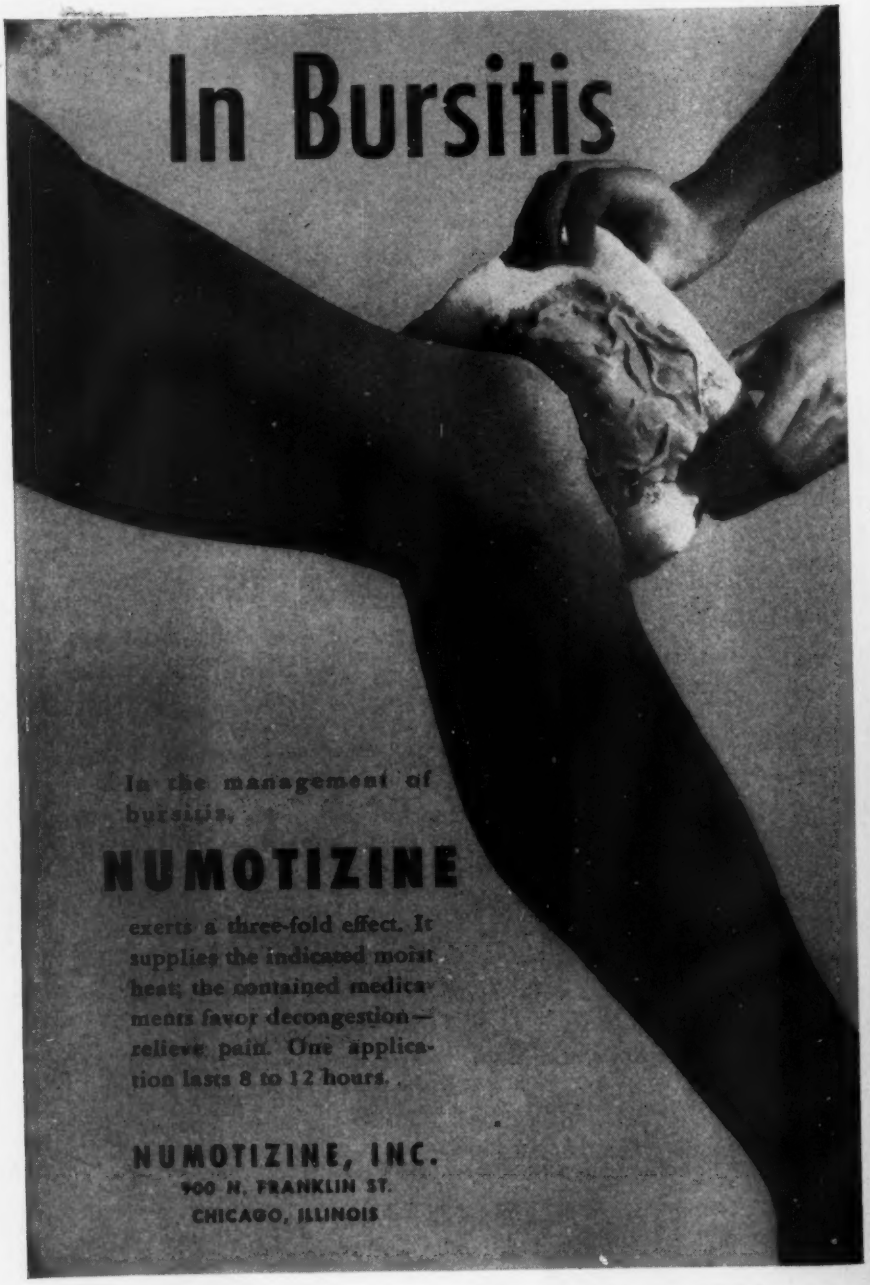
Please send literature and a supply sufficient for 6 months clinical trial.

SMJ-9

DR.

ADDRESS

CITY STATE


In Bursitis
In the management of bursitis,
NUMOTIZINE
exerts a three-fold effect. It supplies the indicated moist heat; the contained medicaments favor decongestion—relieve pain. One application lasts 8 to 12 hours.
NUMOTIZINE, INC.
900 N. FRANKLIN ST.
CHICAGO, ILLINOIS

For the Failing Heart

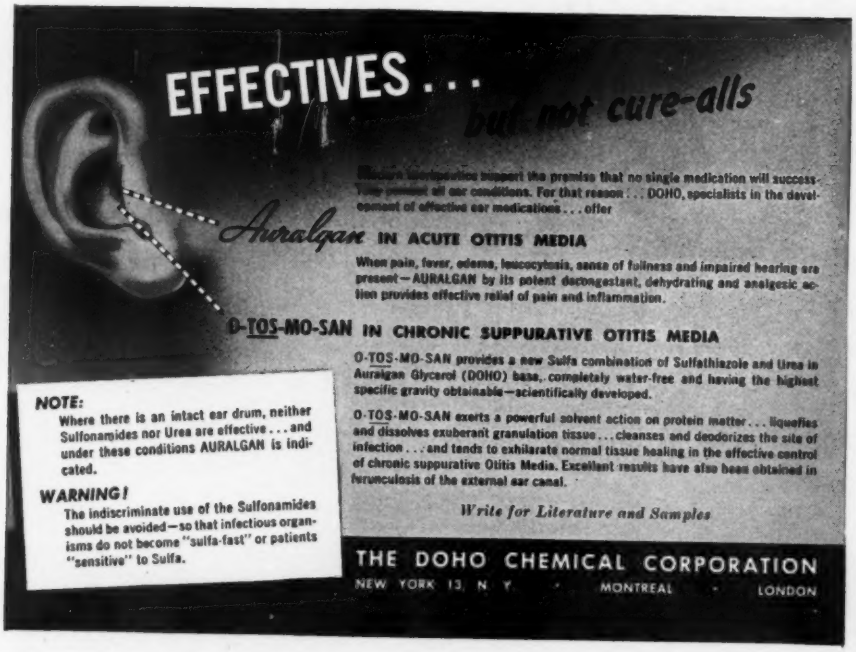
Phyllicin

A "theophylline" for oral administration — quick acting and well tolerated. For the relief of cardiac distress and pain, to diminish dyspnoea and to reduce edema.

DOSE: 1 or 2 tablets (4 grains each) after meals.

Phyllicin, brand of theophylline-calcium salicylate, Trade Mark reg. U. S. Pat. Off.

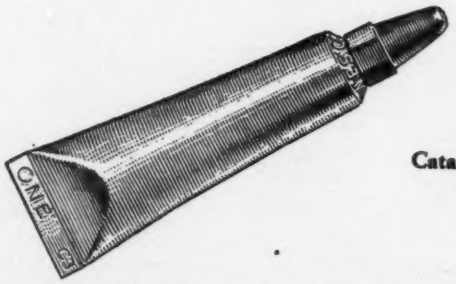
Bilhuber-Knoll Corp. Orange, N. J.


EFFECTIVES . . .
but not cure-alls
Auralgan IN ACUTE OTITIS MEDIA
When pain, fever, edema, leucocytosis, sense of fullness and impaired hearing are present—AURALGAN by its potent decongestant, dehydrating and analgesic action provides effective relief of pain and inflammation.
O-TOS-MO-SAN IN CHRONIC SUPPURATIVE OTITIS MEDIA
O-TOS-MO-SAN provides a new Sulfa combination of Sulfathiazole and Urea in Auralgan Glycerol (DOHO) base, completely water-free and having the highest specific gravity obtainable—scientifically developed.
O-TOS-MO-SAN exerts a powerful solvent action on protein matter . . . liquefies and dissolves exuberant granulation tissue . . . cleanses and deodorizes the site of infection . . . and tends to exhilarate normal tissue healing in the effective control of chronic suppurative Otitis Media. Excellent results have also been obtained in furunculosis of the external ear canal.
NOTE:
Where there is an intact ear drum, neither Sulfonamides nor Urea are effective . . . and under these conditions AURALGAN is indicated.
WARNING!
The indiscriminate use of the Sulfonamides should be avoided—so that infectious organisms do not become "sulfa-fast" or patients "sensitive" to Sulfa.
Write for Literature and Samples
THE DOHO CHEMICAL CORPORATION
NEW YORK 13, N. Y. · MONTREAL · LONDON

"M. E. S. CO."

OPHTHALMIC AND NASAL

Ointments

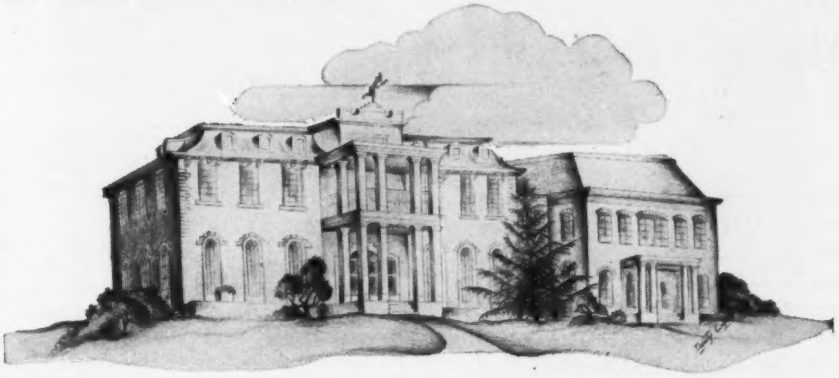


Catalog and Price List
On Request

Manhattan Eye Salve Company

Incorporated 1063-65 Bardstown Road, LOUISVILLE 4, KENTUCKY

ONE OF AMERICA'S FINE INSTITUTIONS . . . . . .



Dedicated to the Scientific Treatment of Nervous and Mental Disorders . . .

. . . In a Setting of Inviting Friendliness and Simple Grace.

BROOK HAVEN MANOR SANITARIUM
STONE MOUNTAIN, GEORGIA

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)

(The Pioneer Post-Graduate Medical Institution in America)

EYE, EAR, NOSE and THROAT

A combined full-time course covering an academic year (9 months). It consists of attendance at clinics, witnessing operations, lectures, demonstration of cases and cadaver demonstrations; operative eye, ear, nose and throat on the cadaver; head and neck dissection (cadaver); clinical and cadaver demonstrations in bronchoscopy, laryngeal surgery and surgery for facial palsy; refraction; roentgenology; pathology, bacteriology and embryology; physiology; neuro-anatomy; anesthesia; physical therapy; allergy; examination of patients preoperatively and follow-up postoperatively in the wards and clinics. Also refresher courses (3 months).

Proctology and Gastro-Enterology

A combined course comprising attendance at clinics and lectures; instruction in examination, diagnosis and treatment; witnessing operations; ward rounds; demonstration of cases; pathology; radiology; anatomy and operative proctology on the cadaver.

FOR INFORMATION ADDRESS

MEDICAL EXECUTIVE OFFICER, 345 West 50th Street, NEW YORK 19, N.Y.

For Patients With Alcoholic Problems

—*The Farm*

A non-institutional arrangement in Howard County, Maryland, for the individual psychological rehabilitation of a limited number of selected voluntary patients with ALCOHOL problems — both male and female — under the psychiatric direction of

Robert V. Seliger, M.D.

CITY OFFICE:

2030 Park Avenue, Baltimore, Md.

TUCKER HOSPITAL, INC.

212 West Franklin St. (Corner of Madison)

RICHMOND, VIRGINIA

This is a private Hospital for the Neurological Practice of Drs. Beverley R. Tucker, Howard R. Masters and James Asa Shield.

The Tucker Hospital is for the treatment of nervous and endocrine diseases. There are departments of massage, medicinal exercises, hydrotherapy and physiotherapy. The Hospital is large and bright, surrounded by a lawn and shady walks, large verandas and has a roof garden. It is situated in the best part of Richmond and is thoroughly and modernly equipped. The nurses are specially trained in the care of nervous cases.

BRAWNER'S SANITARIUM

Established 1910

SMYRNA, GEORGIA

(Suburb of Atlanta)

● *For Nervous and Mental Disorders*
Drug and Alcohol Addictions

JAMES N. BRAWNER, M.D.
Medical Director

ALBERT F. BRAWNER, M.D.
Department for Men

JAMES N. BRAWNER, JR., M.D.
Department for Women

HOYE'S SANITARIUM

"In the Mountains of Meridian"

MERIDIAN, MISS.

Diagnosis and Treatment of NERVOUS AND MENTAL DISEASES, ALCOHOLIC AND DRUG ADDICTIONS. Especially equipped for the treatment of MENTAL DISORDERS and those requiring ELECTRO-SHOCK THERAPY. Convalescents, elderly people and mild chronic mental cases also admitted.

Write P. O. Box 106 or Telephone 524

Dr. M. J. L. Hoye, Supt.

Fellow of the American Psychiatric Association

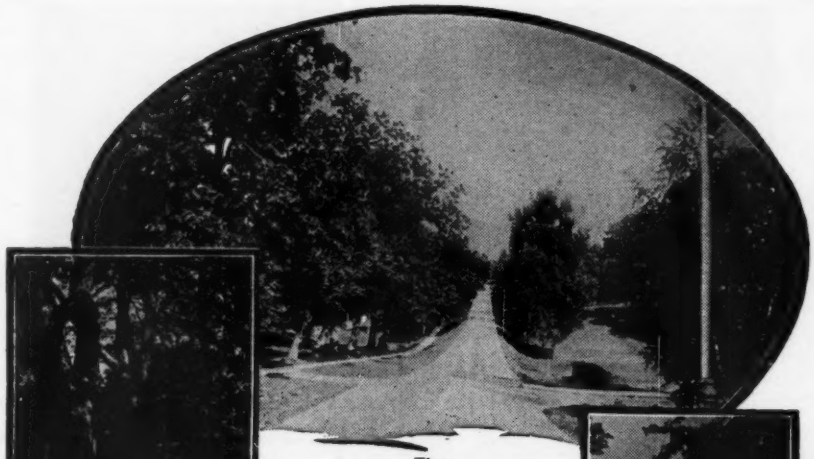
HILL CREST SANITARIUM

FOR NERVOUS AND MENTAL DISEASES AND ADDICTIONS

Insulin and Electro-Shock Therapy used in Selected Cases. Gradual Reduction Method used in the Treatment of Addictions
Established in 1925

Thoroughly modern in architecture and construction. Eight departments—affording proper classification of patients. All outside rooms, attractively furnished. Several bathrooms and rooms with private bath on each floor. Also a spacious sun parlor in each department. Located on the crest of Higdon Hill, 1050 feet above sea level, overlooking the city, and surrounded by an expanse of beautiful woodland. Ample provision made for diversion and helpful occupation. Adequate night and day nursing service maintained.

James A. Becton, M.D., Physician-in-charge **James Keene Ward, M.D., Associate Physician**
P. O. Box 2896, Woodlawn Station, Birmingham 6, Ala. **Phones 9-1151 and 9-1152**



The
Cincinnati Sanitarium
Inc. 1873
For Mental and Nervous Diseases

A strictly modern hospital fully equipped for the scientific treatment of nervous and mental affections. Situation retired and accessible. For details write for descriptive pamphlet.

Emerson A. North, M.D.
Charles Kiely, M.D.
Visiting Consultants
D. A. Johnston, M.D.
Medical Director

ELLIOTT OTTE, Business Manager
Box No. 4, College Hill
CINCINNATI, OHIO

"REST COTTAGE" College Hill, Cincinnati, Ohio

For purely nervous cases, nutritional errors and convalescents.

Completely equipped for hydrotherapy, massages, etc.

Cuisine to meet individual needs.

Emerson A. North, M.D.
Charles Kiely, M.D.
Visiting Consultants

D. A. Johnston, M.D., Medical Director

Elliott Otte, Bus. Mgr., Box No. 4, College Hills, Cincinnati, Ohio.

STUART CIRCLE HOSPITAL

413-21 Stuart Circle

RICHMOND 20, VIRGINIA

Medicine:
ALEXANDER G. BROWN, JR., M.D.
MANFRED CALL, III, M.D.
M. MORRIS PINCKNEY, M.D.
ALEXANDER G. BROWN, III, M.D.

Obstetrics and Gynecology:
WM. DURWOOD SUGGS, M.D.
SPOTSWOOD ROBINS, M.D.

Ophthalmology, Otolaryngology:
W. L. MASON, M.D.

Pediatrics:
ALGIE S. HURT, M.D.
CHARLES PRESTON MANGUM, M.D.

Pathology:
REGENA BECK, M.D.

Physiotherapy:
CONSTANCE PHILLIPS, R.P.T.T.

Surgery:
CHARLES R. ROBINS, M.D.
STUART N. MICHAUX, M.D.
A. STEPHENS GRAHAM, M.D.
CHARLES R. ROBINS, JR., M.D.
CARRINGTON WILLIAMS, M.D.

Urological Surgery:
FRANK POLE, M.D.
MARSHALL P. GORDON, JR., M.D.

Oral Surgery:
GUY R. HARRISON, D.D.S.

Roentgenology and Radiology:
FRED M. HODGES, M.D.
L. O. SNEAD, M.D.
HUNTER B. FRISCHKORN, JR., M.D.
D. V. KECHELE, M.D.

Director:
MABEL E. MONTGOMERY, R.N., M.A.

CITY VIEW SANITARIUM

For MENTAL and NERVOUS DISEASES and ADDICTIONS

Established in 1907

AN ENTIRELY NEW PLANT ERECTED IN 1922

Separate buildings for men and women, ideally arranged and equipped with every facility for the comfort, care, and treatment of the class of patients received.

It is upon the character of service rendered, rather than upon physical facilities that the reputation of such an institution must rest, and to give every patient the maximum of individual attention and unremitting care at all times is the basic principle of our work. An efficient organization exists in all departments. There is maintained an abundantly sufficient staff of capable nurses, divided into day and night shifts, assuring to every patient constant service through each of the twenty-four hours of the day. At midnight this service is as real as at midday.

Situated in the midst of a fifty-acre tract and surrounded by a large grove and attractive lawns.

JOHN W. STEVENS, M.D.
Founder

WILL CAMP, M.D.
Medical Director

NASHVILLE R. F. D. No. 1 TENNESSEE

Reference: The Medical Profession of Nashville

Prevent INFECTION

with **MERCUROCHROME**

(H. W. & D. Brand of merbromin, dibrom-oxymercuri-fluorescein-sodium)

Extensive use of the Surgical Solution of Mercurochrome has demonstrated its value in preoperative skin disinfection. Among the many advantages of this solution are:

Solvents which permit the antiseptic to reach bacteria protected by fatty secretions or epithelial debris.

Clear definition of treated areas. Rapid drying.

Ease and economy of preparing stock solutions.

Solutions keep indefinitely.

The Surgical Solution may be prepared in the hospital or purchased ready to use.

Mercurochrome is also supplied in Aqueous Solution, Powder and Tablets.

HYNSON, WESTCOTT & DUNNING, INC.

Baltimore 1, Maryland

SOUTHERN MEDICAL JOURNAL
JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION
PUBLISHED MONTHLY BY THE SOUTHERN MEDICAL ASSOCIATION AT BIRMINGHAM, ALA.

Volume 39 SEPTEMBER 1946 Number 9

SURGERY OF WAR INJURIES OF THE EYELIDS*

By ALSTON CALLAHAN, M.D., F.A.C.S.†
Birmingham, Alabama

The conflict just ended has revolutionized not only modern warfare in its technical aspects, but it has also brought forth a wide variety of surgical injuries in such great profusion that military surgery has been stimulated to find newer and better methods of repair. This is particularly true for oculofacial wounds incurred by men exposed not only to direct enemy fire such as shell fragments and sniper's bullets, but also to extensive burns and other injuries resulting from crippling hits on their own machines, be they airplanes or tanks.

Military evacuation channels start at the overseas battalion aid station and end in a continental specialty center. One of the eight ophthalmic centers was Northington General Hospital at Tuscaloosa, Alabama. At this installation we did not have the advantage of seeing these cases immediately after the battle trauma had been inflicted; yet, once they reached the center, we were able to retain them as long as necessary for study and treatment and thus to evaluate end-results. Oculofacial wounds, deformities and scars in great numbers and in various stages of progress therefore passed through our eye services.

The limitation of time and space necessitates a selection of the more typical and therefore instructive cases and the representative procedures used in the correction of these types of lesions.

The following are presented as sample problems illustrating characteristic clinical and technical phases of therapy.

NOTCH REPAIR

A 31-year-old soldier was struck by fragments of a high explosive shell. He suffered multiple penetrating wounds of the chest, face and right forearm. The left eye was enucleated and treatment of his other injuries was also given at the 192nd General Hospital.

When seen by us five months after the injury, the eye socket was moderately distorted and the central third of the lower left lid was missing (*Figs. 1* and *2*). A portion of the medial fragment of the lid had everted downward. Meticulous care is required in all such lid notch repair because of the marked tendency to tissue separation and the frequent recurrence of the initial defect. Surgical revision consisted of dividing the lower lid into two laminae: the anterior made up of skin and subcutaneous tissue and muscle, the posterior of tarsus and conjunctiva (*Fig. 3*). Two small triangular sectors were removed: one medial to the defect in the anterior lamina and one lateral to the defect in the posterior lamina. Two separate suture lines were therefore obtained with equal distribution of tissue tension in both laminae.

This technic prevents formation of a cicatrix extending completely through the eyelid at one point. The postoperative appearance six weeks later, with a plastic eye inserted, is shown (*Figs. 4* and *5*).

---

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

*The author wishes to express his indebtedness to Robert Shriver for the photographs and to Miss Martha Redewill and Mrs. Ruth Mark for the drawings.

†Professor of Ophthalmology, Medical College of Alabama. Formerly Captain, Medical Corps, Army of United States.

Fig. 1
Large notch in medial portion of left lower lid.

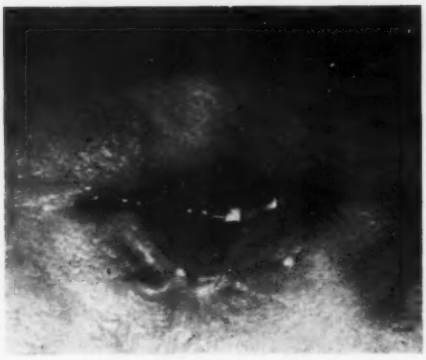


Fig. 2
Close-up of left lids shows central third of lid is missing.

Fig. 3
Notch repair. The lower lid has been divided into two laminae: the anterior of skin, subcutaneous tissue and muscle, and the posterior of tarsus and conjunctiva. A small triangular sector has been removed from the anterior lamina medial to the defect, and another from the posterior lamina lateral to the defect. When these are united with sutures, the tension is distributed.

PEDICLE GRAFT

A 20-year-old soldier was riding in an armored car when a shell exploded nearby causing third degree burns of the face and left upper lid. Immediate surgical treatment was given at the 8th Evacuation Hospital. On admission to our center, four months after the injury, it was noted

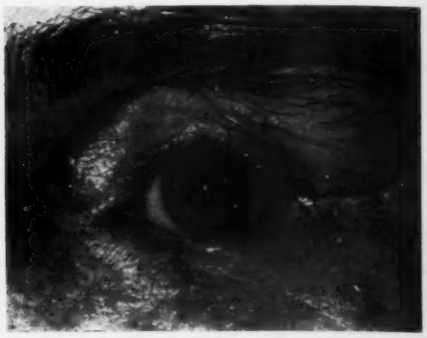


Fig. 4
Six weeks postoperatively the scar is less obvious. A plastic eye has been inserted.

Fig. 5
Full face view of correction obtained.

Fig. 6
Shortening of left upper lid following third degree burn from explosion of shell.

that on downward rotation of the eyes the left lid did not adequately cover the cornea (*Fig. 6*).

A horizontal incision was made through the skin of the upper lid across the shortened area, and then continued inferiorly and then medially to outline a pedicle of appropriate width in the lower lid. Surgical lid adhesions were made between the left lids (*Fig. 7*). The cicatricial tissue in the upper lid resulting from the burn was removed. The pedicle was dissected from

Fig. 7

The rubber pegs of the sutures for the surgical lid adhesions may be seen. An incision has been made through the lateral portion of the upper lid where the skin was shortened by the burn, and a pedicle of appropriate width in the lower lid has been outlined.

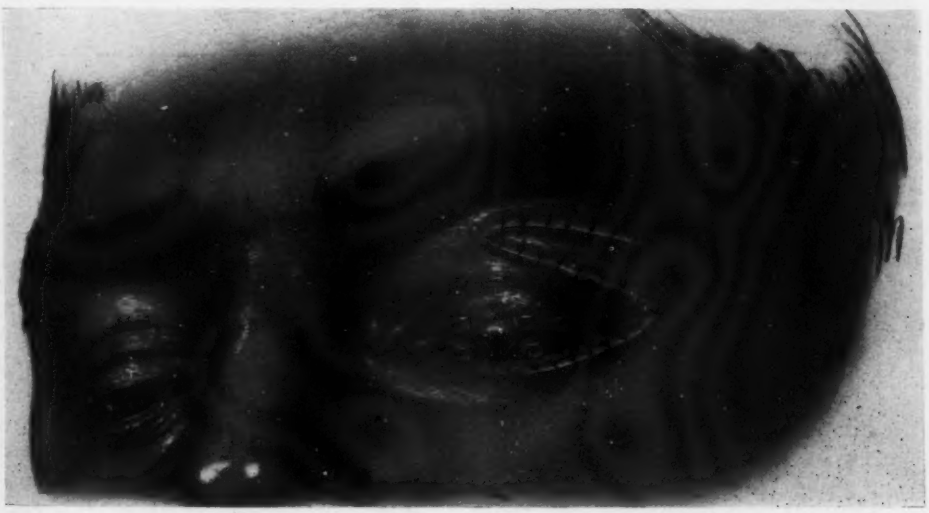


Fig. 8

The pedicle has been dissected from the lower lid, and transposed into the upper Closure of the donor area exerts proper tension on the pedicle in its new position.

the underlying tissue and transposed into the defect in the upper lid, and sutured (braided silk 4-0). Closure of the donor area exerted proper tension on the pedicle in its new position (*Fig. 8*). The appearance one week after the operation and immediately prior to the removal of the sutures was satisfactory. The lids were held in contact for nearly five months by these surgical adhesions to minimize secondary retraction of the graft (*Fig. 9*). Inspection two months after the division of these artificial adhesions showed adequate correction of the original deformity (*Fig. 10*).

FREE SKIN GRAFT FOR AIRMAN'S ECTROPION

Bilateral ectropion of the upper lids occurring particularly in airmen caught in burning planes is one of the most frequent complications of facial burns (*Fig. 11*). Present day eye-goggles usually provide fair protection against eye burns, even though they expose fliers to severe injuries from shattered glass. Similarly the helmet and oxygen mask cover most of the forehead, nose and all but the medial third of the lower lids. This 21-year-old airman was not wearing his goggles at the time of the injury. A striking complication often associated with these eye lesions is a burn of the right hand, for the airman usually slips his glove off to ready himself for releasing his parachute. Despite the severity of the burn, vision in this patient remained 6/6, though photophobia was marked. When he closed his eyes firmly the subcutaneous scar was evident (*Fig. 12*). The severe ec-

Fig. 11
Bilateral ectropion of the upper lids. Marked photophobia. Vision 6/6 o. u.

Fig. 9
Lid adhesions remain in place for four months to minimize secondary retraction.

Fig. 12
Forcible closure of lids and brow shows the subcutaneous scarring. Note outline of airman's helmet on forehead.

Fig. 10
Postoperative appearance at six months. The adhesions have been divided for two months.

Fig. 13
Ectropion more marked on downward gaze.

tropion, especially of the right upper lid, was particularly noticeable on downward gaze (*Fig. 13*). The immediate care of the burns, which was quite inadequate, was rendered at a Rumanian hospital in April, 1944. These pictures were made in November, 1944. A free skin graft to the right upper lid was performed in January, 1945, by Major Clement Clarke with myself as assistant, and I grafted the left upper eyelid in March with Capt. Jerome H. Cohen as assistant. A slightly curved horizontal incision was made in

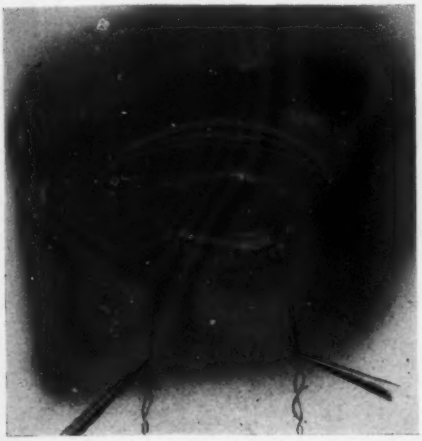


Fig. 14

Wheeler sutures have been placed in position for the lid adhesions. An incision about 4 mm. from the lid margin and parallel with it has been made through the skin of the upper lid.

Fig. 15

The Wheeler sutures have been tied. The cicatricial tissue has been removed.

Fig. 16

An area of retro-auricular skin has been grafted into the upper lid. A roll of cotton covered with a strip of vaseline gauze is laid against the graft, and the long sutures tied over it.

Fig. 17

The long sutures are tied over a cotton roll wrapped with one layer of vaseline gauze. This was allowed to remain in place for seven days.

Fig. 18

Final appearance. Note sulci of lids. The graft is very flexible.

the upper lid to begin the surgical repair (*Fig. 14*). A Wheeler lid adhesion was made on either side of the pupil, thus bringing the lids in contact but still allowing vision (*Fig. 15*). The cicatricial tissue was removed from the upper lid and the sutures tied. A free skin graft was

Fig. 19
Adhesions have been divided now for three months. Ample skin is present.

Fig. 20
Downward gaze shows ectropion to be corrected.

Fig. 21
Deformity of the medial canthus. Chronic dacryocystitis is present. Note defect of supra-glabella region.

Fig. 22
Skull defect repaired by Major Arthur Barsky. Note the small size of the lids and the lateral displacement of the medial canthus.

Fig. 23
Two small openings have been made through the frontal process of the maxilla slightly higher than the level of the left internal canthus. Tantalum wire has been inserted through these openings, and brought out through the lid margin medial to the puncta.

placed into this prepared bed (*Fig. 16*). A section of skin from the cephalo-auricular angle was used for repair of both upper lids, though further experience has led us to prefer the more flexible and elastic skin from the supraclavicular region, if eyelid skin is not available. Alternating long and short sutures were used to secure the graft in place. The long sutures were tied over a cotton roll covered by vaseline gauze which was allowed to stay in place for seven days (*Fig. 17*). Five months later, in July, the surgical adhesions of the right lids were divided and in August those of the left lids were divided. The appearance on November 10, 1945, was satisfactory (*Fig. 18*). When he closes his eyes, adequate skin is present (*Fig. 19*), and on looking down it can be observed that the ectropion has been corrected (*Fig. 20*). Photophobia is practically absent.

Fig. 24
The tantalum wire is tied in place.

Fig. 25
When wire was emoved after two months, lids remained in proper position.

Fig. 26
Final appearance with plastic eye inserted.

WIRING OF THE CANTHUS

A 24-year-old soldier was wounded by a shell fragment, in September, 1944. The missile entered through the right maxillary sinus, right orbit, and anterior cranial fossa and made its exit through the frontal sinuses. Emergency surgery, which included the removal of the right eye, was performed at the 104th Evacuation Hospital.

The detachment of the medial extremities of the right eyelids caused a shortening of the palpebral fissure and the deformity of the inner canthus (*Figs. 21* and *22*). Chronic dacryocystitis developed, which was resistant to treatment. In February, 1945, the defect of the forehead was repaired with a bone graft by Major Arthur Barsky. In May, 1945, the deformity of the canthus was repaired. The lacrimal sac was found to be displaced anteriorly and completely invaded by scar tissue which had infiltrated the whole area. Both the sac and cicatricial tissue were excised. Two small openings were made with a dental drill through the frontal process of the maxilla at a slightly higher horizontal level than the left internal canthus (*Fig. 23*). Tantalum wire (0.016 inch in diameter) was inserted into one of the openings, and brought out through the other by means of a Terrell hook. The wires were placed through the medial ends of the tarsal plates and carried externally through the margins of the lids just medial to the puncta. The ends were securely tied over a rubber peg and the wire was left in place for two months (*Fig. 24*). This procedure lengthened the lids, and after the wire was removed the lids remained in their normal position (*Fig. 25*). The final result, as seen November 1, 1945, with a plastic eye inserted, was satisfactory (*Fig. 26*).

SUMMARY

Methods for repair of the following lid deformities are presented: (1) notching of the lids; (2) cicatricial shortening of the lid; (3) ectropion, and (4) deformity of the inner canthus.

908 South Twentieth Street

DISCUSSION (*Abstract*)

Dr. Calhoun McDougall, Atlanta, Ga.—Dr. Callahan's demonstration of the wonderful plastic eye work the medical men are doing on our service men takes me back to the old days of Fort McHenry, U. S. General Hospital No. 2, at Baltimore. I was there eight months with Dr. Wheeler. We did a great amount of plastic work in ophthalmology. It is nice to see the old principles we worked out then used now by Dr. Callahan. His results are excellent.

Dr. Harvey B. Searcy, Tuscaloosa, Ala.—During World War I, I was an ophthalmologist in Base Hospital No. 115 of which Dr. E. C. Ellett was commanding officer and Dr. V. P. Blair plastic surgeon. I had the opportunity of seeing many of the plastic cases, but these cases were so recent and had to be evacuated home so soon that they could not be followed.

Dr. Wheeler was, in my opinion, the pioneer of plastic surgery in ophthalmology and his work has been carried on by many others. The Northington General Hospital has 400 beds for ophthalmological cases. As soon as these cases are able, they are furloughed home to make room for other cases and return for further plastic work. Captain Callahan is the Chief of the Ophthalmic Section. He and his staff of ophthalmologists have the unlimited backing of the United States Medical Corps as to finances, equipment, personnel, and the patients have free hospitalization and time for thorough plastic work. The work there is the culmination of all the advances in plastic surgery gained through the experiences of years of accumulated literature.

Plastic surgery is a highly developed specialty in the specialty of ophthalmology. Few physicians in private practice have the proper training for this type of work and the patients are rare who have the finances to withstand the prolonged hospitalization that extensive plastic surgery demands.

I would like to ask Captain Callahan the following questions. Is penicillin being used extensively in this type of work? Are the sulfa-drugs being used and how? Has he had many cases in which both eyes were blinded? Has sympathetic uveitis occurred in any of these cases? Are contact lenses being used to any extent by the Army?

Dr. Callahan (*closing*).—We use penicillin almost routinely on large skin grafts around the eye, and we believe that is the reason many of our skin grafts are successful. We use 30,000 units every three hours intramuscularly for ten days almost as a routine.

That is particularly true when we use mucous membrane for grafting around the socket. We have had the experience of using a few without the penicillin, and they were less successful. Since we began using penicillin they have all been successful.

We often drop penicillin in the eye after an eye operation. We often cover the operative field in a plastic operation before we put the graft on. But we do not feel that that does very much good. We do think that intramuscular use is very effective.

We do not employ sulfa routinely. We have used it in some cases. In some cases of orbital cellulitis we use penicillin and sulfa together.

At Tuscaloosa, Alabama, which is one of the eight centers, we have seen about thirty cases of bilateral blindness in this war. Those cases are not supposed to come to Alabama; they are supposed to go to the Valley Forge General Hospital at Phoenixville, Pennsylvania. All cases of bilateral blindness or of bilateral severe injury to both eyes are sent there. Sometimes these cases are sent to us because the patient's home is close by, and they desire to have us see him while he is on a furlough.

The Army's program for the blind is a very fine one, and it is planned on a long range basis.

Dr. Searcy asked about sympathetic uveitis as seen in this war. We have not seen any cases that were sent back to us. Several months ago Colonel Vail, the Ophthalmologic Consultant for the Surgeon General, said that he had not seen any, and he had been Consultant in Ophthalmology for the European Theatre of Operations, so I believe that not many cases have occurred in this war.

My experience has been only in the continental United States, and it seems that the surgeons in the forward stations have been very conservative in enucleation of eyes. We have seen badly injured eyes come back which we thought would have to be enucleated, some of which were retained, and hand movements or even 20/400 vision was retained.

The last question Dr. Searcy asked was about contact lenses. We have a program at Northington of fitting contact lenses for the aphakic eye. As would be expected war injuries have cause many traumatic cataracts, and the Army has been interested in having a contact lens fitted for the aphakic eye which has not always, but has in most cases, returned single binocular vision.

Fortunately, the soldiers who have injured eyes and have the contact lens fitted are able to tolerate the contact lens surprisingly well. Some of them have worn them for as long as eight hours on the second or third day. That is a very unusual finding in contact lens work.

Dr. Buffington has just asked about fitting the lens. We fit the lens with curvature for distant vision only,

but the pupillary area in a contact lens is so small that if you attempted to put a bifocal correction on the lower part it would not be useful, because that eye would probably be getting split vision. So when a soldier who has a contact lens fitted wants to use both eyes for close work, it is necessary to use the ordinary spectacles with a plano in front of the normal eye, and a +2.50 or +3.00 sph. in front of the contact lens eye.

A SIMPLE AID IN DIFFICULT ABDOMINAL CLOSURES*

By NICHOLAS A. SCHNEIDER, A.B., M.D.
St. Louis, Missouri

Though great progress has been made in the art and science of anesthesia, the surgeon is still not too infrequently confronted with the problem of closing abdomens of patients in whom anesthetists do not seem to be able to achieve adequate relaxation.

Several instruments have been presented to the profession which are effective in preventing the viscera from coming into the suture line while the abdomen is being closed. These instruments do not, however, relieve the tension on the tissues forming the suture line in an inadequately relaxed patient. The procedure being presented prevents the abdominal viscera from coming into the suture line and also allows the tissues that are sutured together to effect abdominal closure to be approximated without tension.

The procedure is as follows: one or more (depending upon the length of the wound to be closed) sutures of strong material are placed in the abdominal wall at right angles to the wound. The sutures are inserted through the full thickness of the abdominal wall on one side of the wound about an inch and a half from the cut edge of the skin, fascia and peritoneum and are brought out through the peritoneum, fascia and skin at corresponding points on the opposite side of the wound. Forceps are attached to the free ends of the sutures. The tissues engaged in the sutures are then pushed together against the forceps attached to the free ends

*Received for publication February 17, 1946.

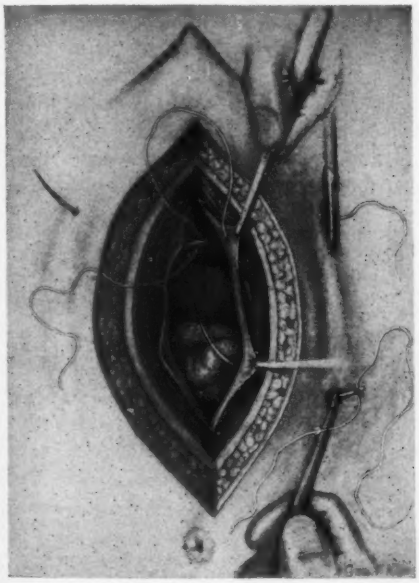


Fig. 1
Wound ready to be closed. Sutures for taking tension off tissues to be sutured together to effect closure and for retaining viscera in peritoneal cavity being set.

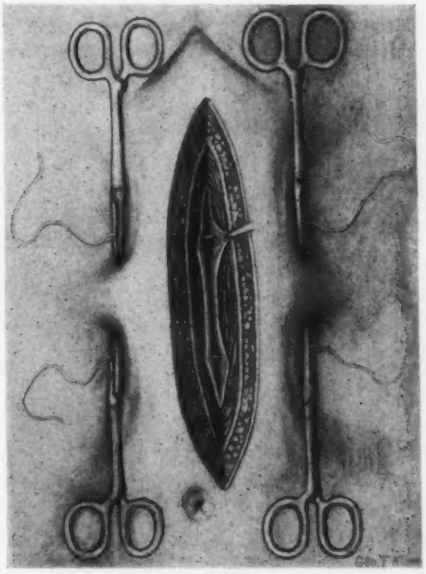


Fig. 2
Tension on abdominal wall shown at points where sutures enter and emerge from skin, leaving peritoneum, fascia and skin loose so they may be sutured together without tension.

until the points in the peritoneum through which the sutures pass are in approximation. Additional forceps are then placed on the sutures where they emerge from the skin. This puts the tension of the abdominal wall at the points where the sutures enter and emerge from the skin and leaves the cut edges of the peritoneum, fascia and skin loose so that they may be sutured together without tension. After the abdominal closure has been completed the forceps are removed from these sutures and they are withdrawn.

GUIDE FOR NAILING FRACTURES OF THE FEMORAL NECK*

By JOSEPH H. GASTON, M.D.†
Columbus, Georgia

I wish to preface this article by apologizing for bringing more metal (not figuratively speaking), into the field of orthopedic surgery. For some time I have thought that we are deteriorating into metallurgists and expert cabinet workers and believe that we might devote our efforts to a better advantage by taking more time with each individual case and would probably arrive at the same or better results by more conservative treatment based on the study of anatomy, pathology, physiology and muscle mechanics. The suggestion to follow is founded on several years of experience in the treatment of fractures at what is now the Reconstruction Unit of the New York Post-Graduate Medical School and Hospital.

Looking back over those years, I recall how little metal, except for skeletal traction we used, and how relatively few open reductions were performed. I am sure that my results in the general run of fractures then were as good or better than they are today, with the tempo of living speeding up, and while I try to finish a fracture as if it were a simple and final job like removing the tonsils or the appendix.

With these thoughts in mind, Dr. Royal Whitman's article emphasizing abduction in hip fractures in a recent issue of the *Journal of Bone and Joint Surgery* was a refreshing breeze through the fog and his deductions as usual were based on experience and sound body mechanics.

Nailing hip fractures has made convalescence more comfortable, so I am still looking for something to make the nailing safer and simpler. Any surgeon who has nailed many hip fractures knows that practice does not make perfect and that frequently our guesses as to proper angles of the nail are wrong and thereby time consuming. This has been proven to me often by my actual operative time records. On one occasion, I may be able to nail a hip in twenty or thirty minutes, whereas on what appears to be a similar case, I may take twice as long to place the nail satisfactorily. This observation and the many "gadgets" that have been suggested as aids in guessing angles confirm my opinion that we need some simple guide that will help simplify and shorten the operative time in these cases, this being important because of the age and poor physical state of many of our patients.

In reference to the importance of abduction, I wish to refer to an actual case. I just recently had an early postoperative extrusion of a Smith-Peterson nail and I partially if not wholly attributed it to the fact that on the second postoperative day I found that the nurse had turned the patient on the opposite side. Naturally the involved leg crossed into marked abduction and it is a question of simple physics to imagine the tremendous leverage and pull at the fracture site.

I have always used sand bags to hold the hip in abduction following the nailing of femoral neck fractures, but it is impossible to instruct and watch continuously the interns, nurses and members of the family. It is natural of course for any one not knowing to turn the patient on the side opposite to the operative wound. We have to make such things "fool proof" and this is particularly true in a general hospital where opening the abdomen for a simple appendix is still more dramatic to the nursing and intern staff than nailing of the hip. I still use the dramatic treatment without any postoperative fixation, but I am firmly convinced that a short abduction spica or brace permitting some body

*Received for publication April 25, 1946.
†Dr. Gaston died July 14, 1946.

motion would be desirable for a reasonable postoperative period.

I wish to illustrate in this paper a guide devised by me which I believe may simplify the operation and eliminate lateral x-ray views which we all know to be more time consuming and more complicated from the standpoint of upsetting our drapes and sterile technic. This guide is a fork-like device to straddle the neck of the femur with the posterior prong curved at its base for identification by x-ray and shortened to a point depending upon the width of its base so that when the fork is tilted forward to the assumed and approximate twelve degree angle of the femoral neck, the two points will be approximately on a line drawn transversely across the neck of the femur as illustrated by *Fig. 1.*

The nail is then driven down a groove in the center of the fork base and as the prongs of the

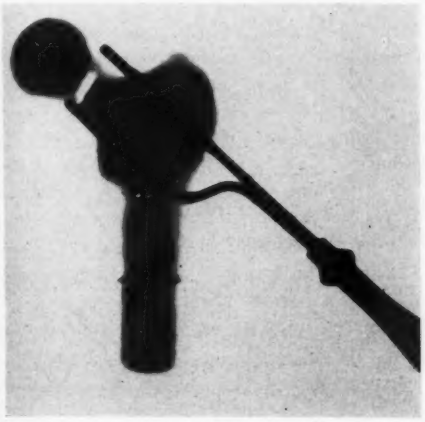


Fig. 1
Fork in what I would consider the proper angle.

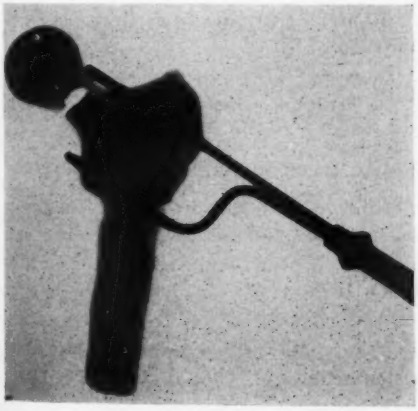


Fig. 2
Fork in place with too much posterior angulation.

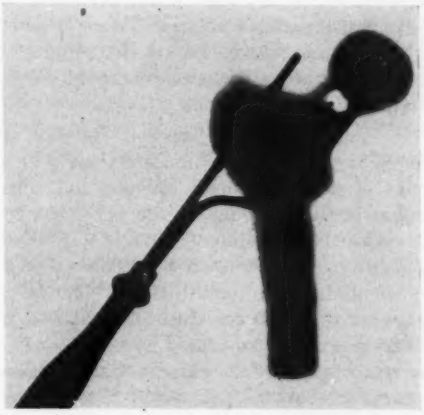


Fig. 3
Fork in place with too much anterior angulation. Lateral view.

Fig. 4 Fig. 5 Fig. 6

Fig. 4. Smith-Peterson nail in lateral position with fork inserted with guide in what I consider proper angle.

Fig. 5. Smith-Peterson nail in place with fork angled too much posteriorly. Lateral x-ray view.

Fig. 6. Smith-Peterson nail in place with fork angled too much anteriorly. Lateral x-ray view.

fork are in fairly close proximity to the neck of the femur there can be little deviation from the correct direction. If the reduction is satisfactory as determined by the Ledbetter method and x-rays, the nail should also hit the proximal fragment and head of the femur in or near the center position.

I realize that this idea is not perfect or fool proof for nailing hip fractures. To me it is practical from the standpoint of determining the direction of the nail in two planes by anterior posterior x-ray views alone.

This guide has been devised for use only through the conventional incision; but with the prongs of the fork longer, sharper and smaller it might be that it could be inserted through the skin before the incision is made. If that is satisfactory, the nail could be driven through a very small incision requiring only one or two sutures at the most for closure. I believe that little trauma would be caused by its use and that if so, perforation of the capsule and soft tissues by the points of the fork would cause no harm and might be beneficial in that the intracapsular pressure would be relieved by drainage.

Desirable hemorrhage might be brought about by puncturing the adjacent soft tissues and capsule and such puncture of the capsule would probably decompress the intra-capsular space and permit soft tissue with some blood supply to fall into closer proximity to the fractured site, thereby promoting better and faster callus formation. This theory is advanced because I have always thought that the trivial trauma that usually produces these fractures necessarily causes very little adjacent trauma and of course little primary hemorrhage, the hemorrhage in my opinion being the first desirable factor in bone repair.

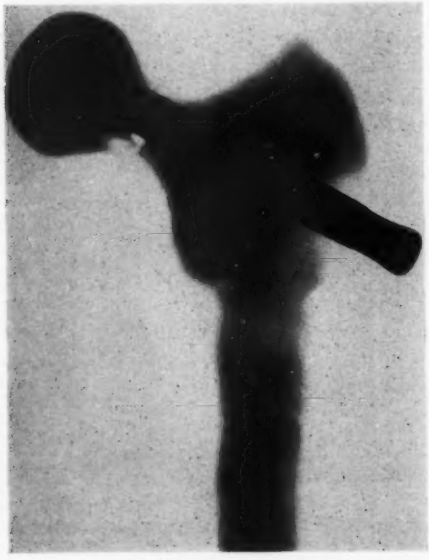


Fig. 7
Smith-Peterson nail in antero-posterior position with guide fork inserted in what I consider proper angle.

NOTE

This guide has been used only experimently and the illustration in this paper are x-rays of the nail and guide using modeling clay as a replica of the head and femoral neck. With this model, the guide and nail were checked under direct vision and control. In these illustrations the fork is rotated on its axis in order to identify and demonstrate more clearly the ends of the prongs. This exaggerated rotation would not be necessary or desirable in actual use.

At this point, I might suggest that this guide if used on a patient should also act as a good self-retaining retractor for better exposure of the nailing site.

I expect to put this device into actual use, and if it does not simplify and shorten the operative procedure I intend to drape my patients and set up my x-ray tube for nailing the fractures with the hip in ninety degrees of flexion so that lateral x-ray can be easily taken to begin with.

I know that the forward angle of the femoral neck is harder to gauge and that we have more room for error in the lateral plane.

AXIOMS

(1) Do not nail a femoral neck fracture with actual internal rotation at the fracture site as the result of over correction of the external rotation deformity. The results are not good. This also applies to intertrochanteric fracture and if in doubt deviate toward some external rotation deformity.

(2) Fractures nailed or treated in slight coxa valga in my experience always do better.

HEART COMPLICATIONS IN INFECTIOUS MONONUCLEOSIS*

REPORT OF A CASE

By FRANK J. GERAGHTY, M.D.
Baltimore, Maryland

While all systems have been reported involved in infectious mononucleosis a review of the literature shows few instances of heart complications as part of the pathology of this disease. The literature is replete with the protean manifestations of this infection. Jaundice has been a favorite topic and since first noted by Mackey and Wakefield,[1] Fowler and Tidrich[2] and Martin[3] also have described it in this condition. The jaundice has been ascribed to both glandular obstruction and hepatitis by various investigators, Tidy,[4] Smeall,[5] and Monat.[6] Boger[7] reported it as a symptom in cases of unusual severity. In addition to enlargement of the glands in the portal fissure mediastinal glandular enlargements have been demonstrated by roentgen study.[8]

A pertussis-like syndrome,[9] pain of low thoracic origin[10] and skin features of urticarial, scarlatiniform, vesicular, erythema nodosal or purpuric character have been reported.[11 12] Nose bleeding is the commonest hemorrhagic manifestation.

Central nervous system signs occur frequently. Rigid neck, Kernig's sign and spinal fluid pleocytosis as an evidence of meningeal irritation were described by Landis[13] and Epstein and Dameshek.[14]

Features of an acute abdominal condition with splenic rupture and death were reported by Ziegler[15] with necropsy study and histologic observations on the liver, kidney, lungs, spleen, heart and appendix. King[16] reported splenic rupture with recovery.

The disease has also simulated and been diagnosed as acute appendicitis and Straus[17] described the histologic study of the removed appendix. I have seen infectious mononucleosis on two occasions when acute appendicitis was the hospital admission diagnosis.

Halcrow, et alii[18] list the following systems as involved in this disease with symptoms: central nervous, stiff neck; renal, lumbar pain, polyuria; glandular; skin, rashes; liver, jaundice; alimentary, vomiting and diarrhea; pulmonary, chest pain especially on breathing.

Not only has this disease such multi-systemic manifestations but it has been reported as coexisting with sickle cell anemia,[19] syphilis,[20] typhoid fever,[21 22] scarlet fever,[9] chicken pox,[23] diphtheria[24] and infectious neuronitis[25] and to produce false-positive serological tests for syphilis and agglutinins against B. typhosus[26] B. melentensis[5] and Proteus X-19 and Proteus OXK.[11]

The pathology of mononuclear infiltration, reticulocyte proliferation and necrosis suggests an acute granulomatous process. It is most likely that mononuclear infiltrative foci can occur, and will occur, to some extent, in one or more organs of the body. Their morphology suggests that they represent a relation to infection rather than a mechanical overflow of mononuclear cells from the blood. If true, the cardiovascular system can be expected to participate in this morphologic change and the present case report confirms this opinion.

Notwithstanding the statement of Contratto[27] "I do not feel that cardiac changes observed in patients with infectious mononucleosis can be attributed to this illness," or the remark of Wintrobe[28] "Cardiac or pulmonary symptoms are uncommon," several authors have described clinical or electrocardiographic evidence of heart involvement. Candel and Wheelock[29] discuss T-wave changes and Logue and Hanson[30] prolongation of the P-R interval, Longcope[23] mentions premature beats, soft blowing apical systolic murmur and electrocardiographic signs of premature ventricular contractions and an inverted T-wave. Each report presents one case. Bradshaw[31] in a discussion of the possible relationship of infectious mononucleosis to rheumatic fever reported a case hospitalized in November 1929, with a febrile illness diagnosed as infectious mononucleosis and presenting clinical features of mitral stenosis in February 1930. Du Bois[32] found a rheumatic-like lesion on the mitral valve at necropsy in a patient who died from infectious mononucleosis complicated by empyema. No clinical evidence of a pre-mortem

*Received for publication March 30, 1946.

valvular lesion was heard. Evans and Graybiel[23] discuss four cases with T-wave changes that they think more significant of pericardial than myocardial involvement because of the character and the duration of the T-wave change. They also report pericardial friction rub and pericarditis with effusion.

CASE REPORT

The patient, a white boy, age 14 years, was seen in consultation with Dr. H. J. Dorf at St. Joseph's Hospital on January 7, 1946. He had been ill for three weeks. The illness began with a cough, hoarseness and pain in both ears on December 15, 1945, and he continued to have daily elevations of temperature of 100° F. until December 27, 1945, when he had a chill which was

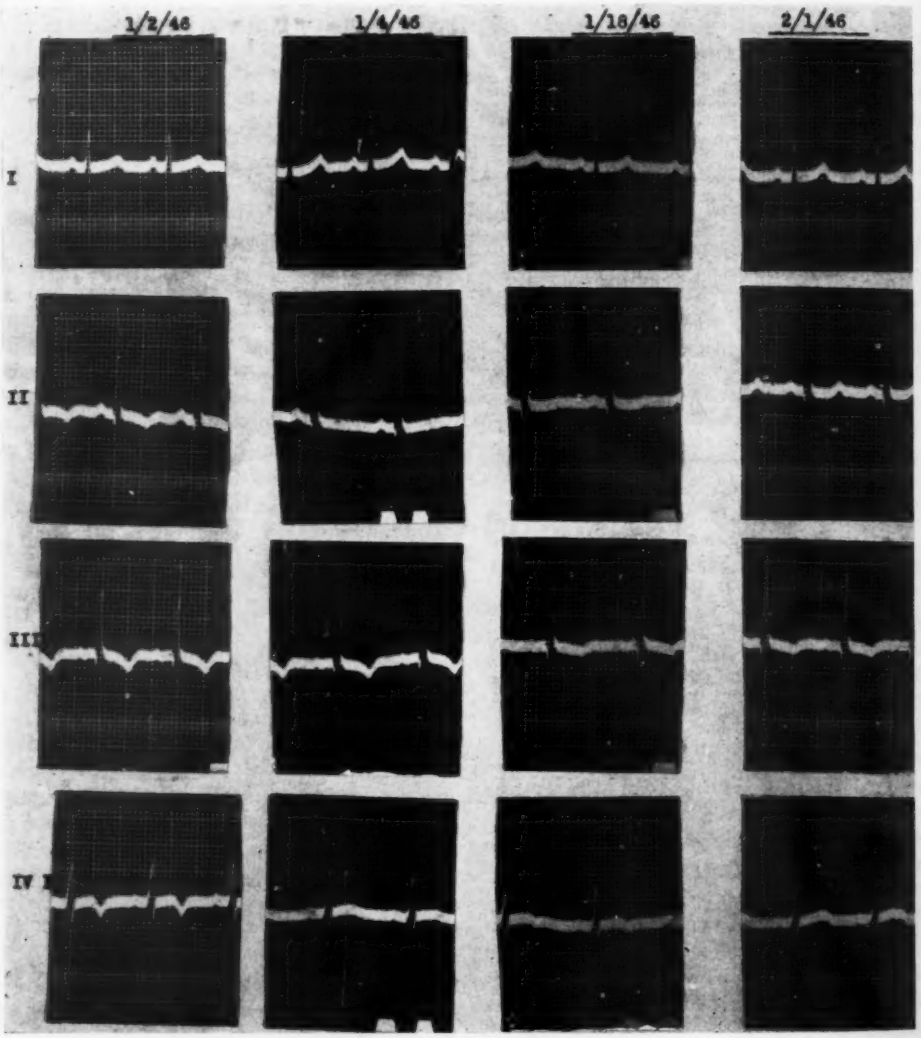


Fig. 1

1/2/46. T 1 upright. T 2, 3, 4 inverted.
1/4/46. T 2 flat, T 3 inverted, T 4 upright, low voltage.
1/18/46. T 2 slightly upright. T 3, 4 less inverted. Rate 87 per minute, previously 100.
2/1/46. T 1, 2, 4 upright. T 3 inverted.

followed by a daily elevation of temperature (102-104° F.) until his admission to the hospital on January 1, 1946. Cough was persistent throughout the illness and at times he complained of transitory pains in the shoulders and knees and abdominal cramps. The family history was irrelevant. He had been treated for Frohlich's syndrome for two years and his tonsils removed two and one-half years before the present illness. There was no history of injection of horse serum or liver therapy.

Physical examination disclosed a well nourished boy with no characteristic features of Frohlich's syndrome. The skin and sclerae were jaundiced. There was hyperplasia of the lymphoid tissue of the posterior pharynx and a few small tonsillar tags present. His tongue was heavily coated. There was marked enlargement of the anterior and posterior cervical lymph nodes, not confluent, slightly painful. The axillary and inguinal lymph nodes were palpably enlarged. The spleen and liver were not felt. The heart was not clinically enlarged, regular and all sounds were clear. The blood pressure was 120/70. It was thought by the intern on the day of admission that there was present a systolic mitral murmur and this centralized attention on the cardiovascular system. An electrocardiogram was ordered and the abnormality noted on this graph,* the second day of hospitalization, can be seen. Repeated electrocardiograms with dates and changes are depicted in *Fig. 1*. The last graph was obtained 13 days after discharge from the hospital.

The other laboratory studies follow. The urine showed a one plus bile and an occasional red cell. There was no anemia (four complete hemograms). White cell count varied between 4,400 and 24,600, with highest percentage of abnormal lymphocytes at 90. Platelets 584,240. Bleeding time 3 minutes and 10 seconds. Clotting time 5 minutes 15 seconds. Blood cultures (four) negative. Van den Bergh direct, positive, and icterus index 60. Bilirubin 4 mg. Cephalin flocculation 4 plus in 48 hours. Blood serology and all agglutinations were negative except paratyphoid-A which was positive in a dilution of 1-80. Sedimentation rate (Wintrobe) was 25 mm. Heterophile antibody titer positive 1-320 dilution. Roentgen study of the chest and heart showed the hilar nodes slightly enlarged. Heart measurements were: Transverse 28.5 cm.; right 4.3 cm.; left 6.3 cm.

The clinical course in the hospital was uneventful. His pulse ranged between 80-120 per minute. At no time did I elicit abnormal heart sounds. On the day of discharge icterus was visible in the sclerae and the cervical lymph nodes were still palpable. Treatment was symptomatic.

DISCUSSION

In my opinion, this case presents myocardial change associated with an acute infection and shows significant electrocardiographic T-wave alterations. If such changes had occurred in the course of acute rheumatic fever they would be accepted as indisputable evidence of disease of the myocardium. Occurring in the course of a disease whose pathology is wide spread it seems logical to conclude that heart muscle was involved in the pathological process. Myocarditis, either specific or non-specific can be associated with or without symptoms or signs. The subsidence of the inflammatory process of the myocardium was signified by a return to normal of the electrocardiogram.

CONCLUSION

Infectious mononucleosis is a multi-systemic disease in which heart complications can occur. A case history is presented and electrocardographic studies are shown in which myocarditis occurred in the course of infectious mononucleosis.

*The electrocardiograms in this study were interpreted by Dr. Richard N. Tillman.

BIBLIOGRAPHY

1. Mackey, R. D.; and Wakefield, E. G.: The Occurrence of Abnormal Leukocytes in the Blood of a Patient with Jaundice. Ann. Clin. Med., **4**:727, 1936.
2. Fowler, W. M.; and Tidrich, R. T.: Unusual Manifestations of Infectious Mononucleosis. Amer. Jour. Clin. Path., **10**:548, 1940.
3. Martin, L.: Glandular Fever with Jaundice, Report of Two Cases. Lancet, **2**:480, 1941.
4. Tidy, L. H.: Glandular Fever and Infectious Mononucleosis. Lancet, **2**:180, 1934. Lancet, **2**:236, 1934.
5. Smeall, L. T.: Glandular Fever (infectious mononucleosis). Edin. Med. Jour., **49**:291, 1942.
6. Monat, H. A.: Infectious Mononucleosis Simulating Acute Infectious Jaundice. Rev. Gastroenterology, **4**:114, 1944.
7. Boger, W. P.: Infectious Mononucleosis of Unusual Severity with Review of Jaundice Cases Occurring in This Disease. Sou. Med. Jour., **37**:546, 1944.
8. Bass, M. H.; and Herman, H.: Infectious Mononucleosis in Childhood. Med. Clin. N. Amer., **9**:589 (Nov.) 1925.
9. West, J. P.: An Epidemic of Glandular Fever. Arch. Pediatrics, **13**:889, 1896.
10. Diasio, J. S.: Infectious Mononucleosis. Military Surgeon, **90**:647 (June) 1942.
11. Leavell, B. S.; and McNeel, J. O.: Infectious Mononucleosis, Unusual Manifestations. Va. Med. Monthly, **69**:180, 1942.
12. Mitchell, R. H.; and Zetzel, L.: Infectious Mononucleosis in the Army. War Med., **5**:356, 1944.
13. Landis, R.; Reich, J. P.; and Perlow, S.: Central Nervous System Manifestations of Infectious Mononucleosis. J.A.M.A., **116**:2480, 1941.
14. Epstein, S. H.; and Dameshek, W.: Involvement of the Central Nervous System in a Case of Glandular Fever. New. Eng. J. Med., **205**:1238 (Dec.) 1931.
15. Ziegler, E. E.: Infectious Mononucleosis. Report of a Fatal Case with Autopsy. Arch. Path., **37**:196, 1944.
16. King, R. B.: Spontaneous Rupture of the Spleen in Infectious Mononucleosis. New Eng. J. Med., **224**:1058, 1941.
17. Straus, R.: Infectious Mononucleosis Simulating Acute Appendicitis with Description of a Specific Lesion of the Appendix. Amer. Jour. Clin. Path., **12**:295, 1942.
18. Halcrow, J. P. A.; Owen, L. M.; and Rodger, N. O.: Infectious Mononucleosis with An Account of an Epidemic in an E. M. S. Hospital. Brit. Med. Jour., **2**:443, 1943.
19. Ray, E. S.; and Cecil, R. C.: Infectious Mononucleosis in the Negro. Report of Three Cases with One Complicated by Sickle Cell Anemia. Sou. Med. Jour., **37**:543, 1944.
20. White, E. C.: Lymphadenosis, An Acute Benign Disease Simulating Acute Leukemia. U. S. Naval Bull., **22**:302, 1925.
21. Sabrazes, J.; and et Saric, R.: Angine et Polyadenite Aigues, Febriles, Lymphomonocytosiques. Bull. Acad. de Med. Paris, **122**:177, 1934.

22. Schwartz, A. S.; and Lidman, B.: Infectious Mononucleosis Complicating Typhoid Fever. Ann. Int. Med., **13**:895, 1939.
23. Longcope, W. T.: Infectious Mononucleosis (glandular fever) with a Report of Ten Cases. Amer. Jour. Med. Sci., **164**: 781, 1922.
24. Look, W.: Das Verhalten von Kranken Nach Lymphoidzelliger Angina Gegenuber Diphtherie und Sonstigen Infektionen. Med. Klin., **31**:915, 1935.
25. Hiller, R. I.; and Fox, N. J.: Infectious Neuronitis Associated with Infectious Mononucleosis. Marquette Med. Rev., **7**:152 (Feb.) 1943.
26. Bernstein, A.: False-positive Wassermann Reactions in Infectious Mononucleosis. Amer. Jour. Med. Sci., **196**:79, 1938.
27. Contratto, A. W.: Infectious Mononucleosis. A Study of 196 Cases. Arch. Int. Med., **73**:449, 1944.
28. Wintrobe, M. M.: Clinical Hematology. Lea and Febiger, p. 658, 1942.
29. Candel, S.: and Wheelock, M. C.: Acute Non Specific Myocarditis. Ann. Int. Med., **23**:309, 1945.
30. Logue, R. B.; and Hanson, J. F.: Heart Block. A Study of 100 cases with Prolonged P-R Interval. Amer. Jour. Med. Sci., **207**:765, 1944.
31. Bradshaw, R. W.: Mitral Stenosis Following Infectious Mononucleosis. Ohio State Med. Jour., **27**:717, 1931.
32. Du Bois, A. H.: De la pathogenie de l'angine a monocytes. Acta. Med. Scandinav., **73**:237, 1930.
33. Evans, W. F.; and Graybiel, A.: Electrocardiographic Evidence of Cardiac Complications in Infectious Mononucleosis. Am. J. Med. Sci., **211**:220, 1946.

3047 St. Paul Street

PRIMARY ATYPICAL PNEUMONIA*

A REPORT OF 420 CASES WITH ONE FATALITY DURING TWENTY-SEVEN MONTHS AT STATION HOSPITAL, CAMP RUCKER, ALABAMA

By WALTER C. McCOY, M.D.†
Birmingham, Alabama

In the past 10 years few diseases have evoked more discussion and more clinical consideration than atypical pneumonia. Much of this work was done in army hospitals; in fact, the first two articles of significance were from troops in the Hawaiian Islands and from Fort Sam Houston, Texas.

Bowen, in the first important contribution, noted (1935) an unusual form of pneumonitis among 89 soldiers in Hawaii.[3] In 1936 from Fort Sam Houston, Allen[1] reported similar cases. Two years later and again in 1940 and 1941, Reimann[24 25 26] noted cases of atypical pneumonia associated with an epidemic of diseases of the respiratory tract. Gallegher in 1941 reported 87 cases among adolescents.[10] A year later, Goodrich and Bradford made a survey of 52 additional cases.[12]

Since these reports, there have been many articles on atypical pneumonia; [4 5 6 7 9 11 13 14 18 19 20 21 22 27 28 29] and, as one might expect, from the military hospitals came reports of large series of cases. During 1943, Meakins made a survey of 100 cases in the RCAF;[17] Kasich and Cohen[16] reported 250 cases; Campbell et al[5] added 200 more cases; and Dingle and his co-workers[8] from the Surgeon General's Office made a survey at Camp Claiborne, Louisiana, of 244 cases with detailed etiological studies. In 1944 van Ravenswaay et al from Jefferson Barracks, Missouri, reported 1,862 cases with an analysis of approximately 300 of these;[30] Karpel[15] and his collaborators in 1945 at the New Orleans P.O.E. Station Hospital studied 500 out of 700 cases.

ETIOLOGY

Primary atypical pneumonia, like the common cold, is still without a known etiologic agent. Almost exhaustive studies have been performed by many investigators, notably Dingle and his co-workers,[8] without finding the causative agent. These intensive, though inconclusive, studies have indicated that, in all probability, atypical pneumonia is caused by some form of virus.

DIAGNOSIS

In the important contribution of Bowen,[3] several points of diagnostic value were observed: the minimal clinical signs on examination, the spotty shadows extending from the lower lobes, the usually dry cough, and the relatively low white counts. Allen[1] also stressed the few physical signs with x-ray evidence of localized pulmonary involvement. Reimann[24] reported fairly severe respiratory symptoms with photophobia, persistent dry cough, profuse sweating, occasional dyspnea and cyanosis, low to slightly increased white counts, with atypical physical signs of pneumonia. He remarked that these pneumonias all recovered with purely symptomatic therapy. The reports of Goodrich and Bradford,[12] Campbell and his collaborators,[5] and the studies of Dingle et alii[8] all showed the slow onset, normal or slightly accelerated respiratory rate despite high fever, minimal physical findings, the absence of significant numbers of organisms in sputum, the relatively normal white count, and the failure to respond to sulfonamides. Many cases of atypical pneumonia are found to produce serum cold agglutinins.[21] Subsequent studies have added little to the diagnosis of atypical pneumonia.

Since the latter part of 1942, we have attempted to diagnose this disease not by exclusion, but by the following definite clinical points: first, x-ray findings out of proportion to both the severity of the patient's illness and

*Received for publication September 10, 1945.

†Major, Medical Corps, AUS, Station Hospital, Camp Rucker, Alabama.

the physical signs; second, the type of sputum. In most cases it was entirely absent, mucoid, or purulent, occasionally blood-streaked, rarely bloody, and with insignificant numbers of bacteria; third, the normal to slightly elevated or slightly depressed white counts; fourth, the relative bradycardia despite high fever; and lastly, the failure to respond to sulfonamides when administered.

There have been many cases which were frankly quite difficult to diagnose with precision. Worth noting were 5 cases (not included in this series) which seemed mid-way between a true pneumococcal pneumonia and an atypical type. These were cases with x-ray evidence of complete, or nearly complete, consolidation of an entire lobe, white counts varying from 12 to 20 thousand, mild chills, bloody sputa containing too few pneumococci to type on repeated examination and an indifferent response to sulfonamides. In these cases, the subsequent course more markedly resembled that of an atypical pneumonia; the definite consolidation, elevated counts, and bloody sputa in our opinion indicated superimposed bacterial infection. It is worth noting that Racker, Rose and Tumen in studying similarly confusing cases have observed proven pneumococcic pneumonias which closely resembled primary atypical pneumonias.[23]

CASE MATERIAL

The present paper is concerned with a detailed analysis of 420 cases of atypical pneumonia on the Medical Service, Station Hospital, Camp Rucker, Alabama, from the period May 1, 1942, to August 1, 1944. During this time there were a total of 449 cases of atypical pneumonia; in 29 cases, records were not available and could not be included in this study. During this period there were admitted to the station hospital a total of 40,209 patients, giving a total incidence of slightly over 1 per cent for the atypical pneumonias.

Of the 420 cases studied, the racial distribution was: 393 white, 26 colored and 1 Chinese. There were 7 civilians, 21 officers and 392 enlisted men. The youngest patient was 2, the oldest was 61. The age incidence is shown in *Table 1.*

EPIDEMIOLOGY

We have been struck by the lack of a seasonal incidence of atypical pneumonia. During the first year of the study there was apparently a positive relationship between the incidence of respiratory diseases and atypical pneumonia, but during the following summer, 1943, we noticed a striking rise in the number of atypical pneumonias when the common respiratory diseases were at their lowest. During the following winter, 1943 to 1944, the number of atypical pneumonia cases was actually lower than it had been during the summer; when the incidence of respiratory diseases dropped again during the spring and summer of 1944, the number of atypical pneumonia cases was practically unchanged. (*Chart 1*).

Although we have been unable to demonstrate patient to patient infection, we have noted that 2 medical officers and 1 nurse who worked on the pneumonia wards developed atypical pneumonia.

ADMITTING DIAGNOSIS

It is perhaps common experience that the diagnosis of atypical pneumonia is not made on admission. Increased awareness of the problem, however, did reflect in the admission diagnosis. Of the first 100 cases not one was diagnosed as atypical pneumonia and only 15 were diagnosed as pneumonia. In the last 100 cases, 25 were diagnosed as pneumonia and in 7 of these, the type of pneumonia was listed as atypical. Five patients were admitted for other conditions and developed atypical pneumonia after 1 to 2 weeks in the hospital. The bulk (297 or 70.7 per cent) of the cases of atypical pneumonia were first

ATYPICAL PNEUMONIA: AGE INCIDENCE OF 420 CASES

	No. of Cases	Percentage
Under 18	2	0.5
18 to 23	192	45.7
24 to 29	128	30.5
30 to 39	81	19.3
Over 40	17	4.0
Total	420	100.0

Average age of the entire group was 26.06 years.

Table 1

diagnosed on the upper respiratory wards (*Table 2*).

ATYPICAL PNEUMONIA: ADMITTING DIAGNOSIS IN 420 CASES

	No. of Cases	Percentage
Nasopharyngitis	238	56.6
Bronchitis, acute	48	11.4
Pneumonia, unclassified	33	7.9
Pneumonia, atypical	29	6.9
Pneumonia, bronchial	12	2.9
Pleurisy	12	2.9
Influenza	7	1.7
Pneumonia, lobar	6	1.4
Observation medical study	6	1.4
Tonsillitis	4	1.0
Possible appendicitis	4	1.0
Malaria	3	0.7
Gastritis or enteritis	3	0.7
Heat exhaustion	2	0.5
Mumps	2	0.5
Asthma	2	0.5
*Miscellaneous	9	2.0
Total	420	100.0

*One each of the following: tuberculosis, bronchiectasis, infected foot, cellulitis of finger, tetanus toxoid reaction, intestinal parasites, headache, intercostal myositis, and cardiac check-up.

Table 2

ATYPICAL PNEUMONIA: CHIEF COMPLAINTS ON ADMISSION OF 420 CASES

	No. of Cases	Percentage
Cough	125	29.8
Chest pains	44	10.5
Fever	43	10.2
Headache	43	10.2
Cold	42	10.0
Chills	32	7.6
Generalized aching	27	6.4
Sore throat	25	5.9
Weakness	10	2.4
Malaise	7	1.7
Abdominal pains	7	1.7
No complaints	5	1.2
Dyspnea	3	0.7
*Miscellaneous	7	1.7
Total	420	100.0

*One each of the following: Shoulder pain, dizziness, hemoptysis, adenopathy, faintness, aching eyes and sneezing.

Table 3

SYMPTOMATOLOGY

The most frequently observed complaint was cough. In 125 cases this was the chief complaint and it was a secondary complaint in practically all of the other patients. Other significant complaints were chest pains, which were not infrequently unilateral, fever, headache, malaise, cold, sore throat, and generalized aching. Five patients had no complaints on admission (*Table 3*).

The almost universally reported slow or insidious onset was not true in the greater number of our cases. Two hundred thirty-nine (239 or 56.9 per cent) had complaints of 3 days or less on admission; an additional 105 had complaints of only 4 to 7 days duration. Only 64 patients had complaints longer than 1 week. (*Table 5*).

Sixteen patients either had no complaints (5 cases) or developed their complaints on the day of admission. A patient said that he had had the same pains for 5 years; the occurrence of an atypical pneumonia, which cleared up uneventfully, apparently made little difference to the complaints of this neurotic individual. In

ATYPICAL PNEUMONIA: SYMPTOMS REPORTED (NOT INCLUDING CHIEF COMPLAINTS) OF 420 CASES

	Number
Cough	290
Fever	267
Chills	176
Malaise	143
Headache	105
Cold	106
Sore throat	106
Chest pains	101
Generalized aching	97
Weakness	50
Vomiting	22
Anorexia	22
Nasal discharge	14
Abdominal pain	13
Lumbar pain	10
*Miscellaneous	14

*Miscellaneous includes the following: Sweating 6; nose bleed 5; dizziness 5; faintness 5; dyspnea 3; hoarseness 3; stiff neck 3; nervousness 2; precordial pain 1; insomnia 1; nausea 1; diarrhea 1; constipation 1; loss of weight 1.

Table 4

general, these cases had a mild to a moderate onset, but there were a striking number of cases which had a fairly sudden onset, appeared acutely ill, and had a prolonged hospitalization.

PHYSICAL FINDINGS

Although the physical findings in atypical pneumonia are minimal, careful examination will nearly always reveal pulmonary abnormalities. Daily observations during the acute phase of the illness in the present series showed that the chests were consistently clear in only 5.8 per cent. However, because a few cases had clear chests, the possibility that many others might be missed was seriously considered and the following investigation was made. During the spring of 1943, x-rays were made on 100 consecutive patients with severe respiratory infections who had no clinical evidence of pneumonia. Roentgenograms thus made disclosed infiltration in only one case and in this case on subsequent examinations crepitant rales were easily heard. Limited though this investigation was, it is our opinion that few cases of atypical pneumonia remained undiagnosed. The ward officers were all alert to the problem and suspicious cases with persistence of slight fever, frequent coughing, or chest pains were x-rayed.

The most common sign found was the presence of rales. Either alone, or in combination with other findings, rales were present in 80 per cent of the cases. Breath sound changes (including both impaired and increased sounds) alone, or associated with other abnormalities, were noted in 58.75 per cent. Friction rubs were heard in 4.25 per cent of the cases.

LABORATORY STUDIES

Whenever possible the following studies were made on all cases: leukocyte count, differential, hemoglobin, urinalysis, sputum examination, and x-ray of the chest. In severe cases (approximately 15 per cent) blood cultures were obtained. In the earlier part of our studies we also obtained multiple agglutinations, and heterophile antibody tests. However, in none of these nor in the blood cultures were any positive results obtained.

The average white blood count ranged from 4,000 to 12,000 (352 cases or 83.8 per cent); in 29 (6.9 per cent) cases, however, the white count exceeded 14,000 and despite the comment to the contrary by Higley and his co-workers,[14] these cases followed the usual course of atypical pneumonia. Rhoads[27] also noted that severe cases of atypical pneumonia developed leukocytosis and he found that the average count of 8 severe cases was 16,270. Dingle et alii[8] reported white counts over 10,000 in 27 per cent of their cases. In our series the percentage of counts over 10,000 was 23.5 per cent. The highest count noted, in a moderately dehydrated patient, was 39,500. Some of these high counts may have been due to the other associated conditions, such as severe reaction to immunization, pharyngeal or tonsillar involvement, or other secondary conditions (*Table 6*).

Of incidental interest were 8 cases (1.9 per cent) which showed eosinophilia of 4 to 47 per

ATYPICAL PNEUMONIA: NUMBER OF DAYS ILL PRIOR TO HOSPITALIZATION IN 420 CASES

	No. of Cases	Percentage
0 to 1 day	16	3.8
1 to 3 days	223	53.0
4 to 7 days	105	25.0
8 to 14 days	47	11.2
15 to 21 days	17	4.1
Over 21 days	10	2.4
Undetermined	2	0.5
Total	420	100.0
Median	3 days	

Table 5

ATYPICAL PNEUMONIA: LEUKOCYTE COUNTS IN 420 CASES

	No. of Cases	Percentage
2,000 to 4,000	3	0.7
4,000 to 6,000	46	10.9
6,000 to 8,000	159	37.8
8,000 to 10,000	98	23.3
10,000 to 12,000	49	11.7
12,000 to 14,000	20	4.8
Over 14,000	29	6.9
Not given	16	3.9
Total	420	100.0

Table 6

cent; allergy studies and search for intestinal parasites failed to demonstrate any pathology.

Sputum examinations were not made on 195 cases (47 per cent) because of non-productive cough. In the 225 cases (54.5 per cent) where sputum examination was made, the usual reports were either "negative" or "pneumococci too few to type" or "occasional strep" or "few staphs noted." In one case the sputum was positive for pneumococci type 18; and in no other cases did the sputum contain sufficient organisms for typing. Grossly, the sputum was noted to be purulent in 117 cases, mucoid in 30, blood-streaked in 51, slight amount of blood in 25 cases, and in 2 cases the sputum was reported as frankly bloody.

X-RAY STUDIES

Only cases with proven x-ray evidence of pneumonia are included in this study. In all but 9 cases more than one x-ray was made; most of the cases had 2 to 4 x-rays. There were a few cases in which 6 or more x-rays were taken.

Initial x-rays showed all variations from a very slight infiltration to complete consolidation of an entire lobe, often with secondary infiltration of a second lobe. Atelectatic changes were frequently encountered and often residual hori-

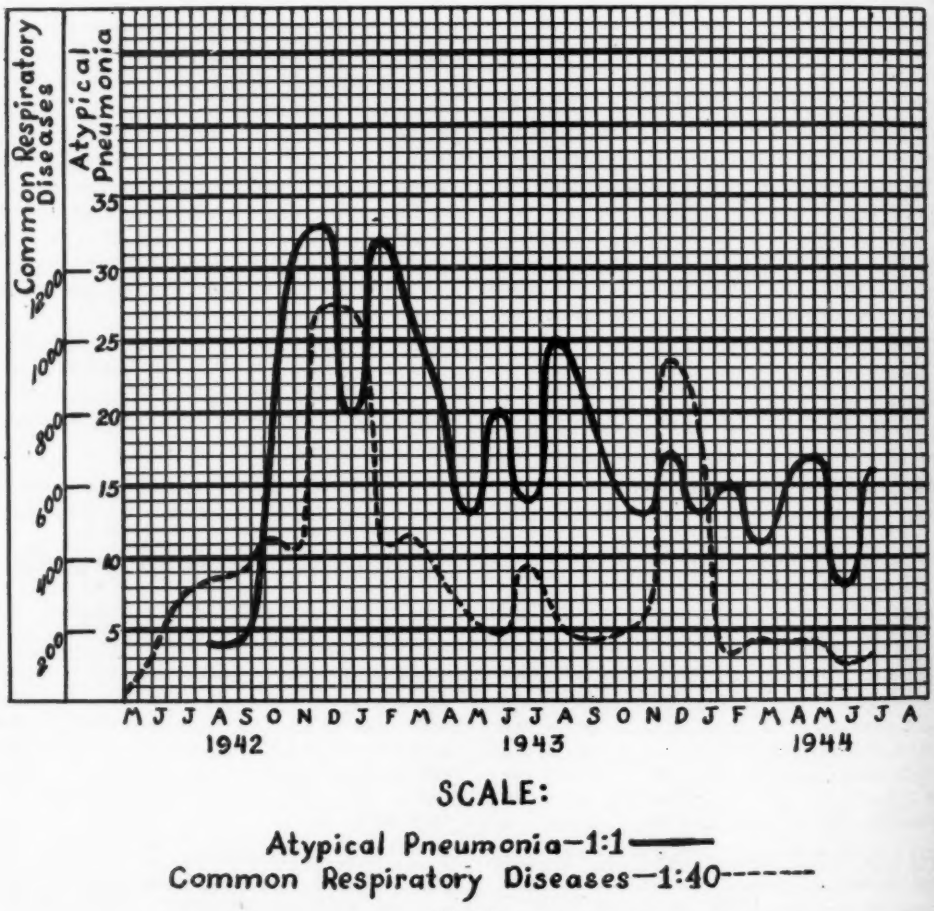


Chart 1
Relationship Between Common Respiratory Diseases and Atypical Pneumonia.

zontal thickenings, interpreted as "atelectatic plates" by the roentgenologist, were noted for as long as 6 to 8 weeks after the first chest plate. It was our policy to discharge no patient until the lungs were entirely clear on physical examination and completely cleared or with only few slight residual changes on roentgenogram. In cases where patients were afebrile for 2 weeks and blood studies were normal, persistent slightly thickened markings or thin atelectatic plates were not considered a contraindication to full duty.

The single most striking complication in the entire series was the tendency to involvement of more than one lobe which was noted in 41 cases (9.7 per cent). The most common lobes involved were the lower ones, either singly or in combination; the next most common lobe involved was the right upper followed by the right middle, with the left upper lobe being least frequently involved. There were all types of combinations, including both upper lobes, entire right lung (2 cases) and entire left lung (1 case); the most extensive involvement noted was in the one fatal case which had involvement of all lobes except the left upper. In 1 case infiltration was limited to the azygos lobe (*Table 7*).

In the majority of cases the lungs had cleared both clinically and by x-ray within 3 weeks. In 13 instances the process required more than 5 weeks to clear (*Table 8*).

ATYPICAL PNEUMONIA: NUMBER OF PULMONARY LOBES INVOLVED AS DETERMINED BY X-RAY STUDIES IN 420 CASES

	No. of Cases		Percentage	
One lobe only		379		90.2
Left lower lobe	163		38.8	
Right lower lobe	142		33.8	
Right upper lobe	27		6.4	
Right middle lobe	22		5.3	
Left upper lobe	21		5.0	
Right hilar region	3		0.7	
Left hilar region	1		0.2	
More than one lobe		41		9.8
Both lower lobes	23		5.5	
*Other combinations	18		4.3	
Total	420	420	100.0	100.0

*Three lobes involved in 3 cases; 4 lobes involved in 1 case and 5 lobes involved in no cases.

Table 7

CLINICAL COURSE

The clinical course of these patients with atypical pneumonia was relatively uneventful. On admission temperatures were recorded in all but 2 instances and it was found that 122 cases had temperatures from normal to 99.5°; 174 had temperatures ranging from 99.6 to 101.6°; and in 107 cases the temperatures varied from 101.6 to 103.6°. In 15 cases the temperatures exceeded 103.6°, the highest single temperature being 105.° (*Table 9*).

Most of the patients had normal temperatures after 6 days. In the more severely ill group, however, febrile reactions continued from 7 to

ATYPICAL PNEUMONIA: TIME FOR LUNGS TO CLEAR BY X-RAY IN 420 CASES

	No. of Cases	Percentage
1 week or less	49	11.7
8 to 14 days	149	35.5
15 to 21 days	113	26.9
22 to 28 days	62	14.8
29 to 35 days	20	4.8
36 to 42 days	6	1.4
43 to 49 days	3	0.7
Over 50 days	4	1.0
Undetermined	13	3.0
Died	1	0.2
Total	420	100.0

Table 8

ATYPICAL PNEUMONIA: ADMISSION TEMPERATURE IN 420 CASES

	No. of Cases	Percentage
Normal to 99.5	122	29.0
99.6 to 100.6	90	21.4
100.6 to 101.6	84	20.0
101.6 to 102.6	61	14.5
102.6 to 103.6	46	11.0
103.6 to 104.6	14	3.4
105	1	0.2
Not recorded	2	0.5
Total	420	100.0

Table 9

15 days; 2 cases had elevations for 19 days and 1 patient was febrile for 20 days (*Table 10*).

The average duration of hospitalization was 26.16 days—a grand total of 10,988 patient days. Few patients stayed in the hospital less than 2 weeks; but only 26 patients stayed in the hospital longer than 7 weeks as shown by the following table (*Table 11*).

COMPLICATIONS

Complications were very few in the entire group. The most frequent complication was extension of the pneumonic process to one or more additional lobes; this was found in 41 cases (9.7 per cent). Although pleural effusion requiring thoracentesis was noted in only one case (see fatal case report), pleural signs were more common and in 13 cases (3.1 per cent) there were friction rubs. Delayed or slow resolution, in which more than five weeks were required for pulmonary clearance, was noted in 13 cases (3.1 per cent). There was recurrence of the pneumonic process in the fatal case only.

Pseudo bronchiectatic changes associated with atypical pneumonia have been described by Blades and Dugan.[2] In 3 instances, patients in the present series were readmitted to the hospital because of "chronic bronchitis," which was believed to be the result of the pneumonic process. Unfortunately, iodized oil studies were not made to exclude possible bronchiectatic changes and we are unable to give any statistics in this respect. Two of the 3 cases were placed on limited service and the third was sent back, apparently recovered, to duty.

Other medical conditions noted in this group were mitral stenosis and insufficiency (3 cases), mitral insufficiency (1 case), severe hyperthyroidism (1 case); and pregnancy of 7 months (1 case). One patient had severe asthma and two were labelled by the psychiatrist as moderate psychoneurotics.

TREATMENT

Most of the cases cleared up with purely symptomatic treatment consisting of bed rest, mild sedation, and a liberal diet. Codeine and occasionally morphine were required to relieve severe chest pains. Oxygen was used to lessen distressing dyspnea in 12 cases; these patients remained in the oxygen tent an average of 2 to 5 days. Transfusions have previously been reported with equivocal results.[28] In this series, small transfusions (250-300 c. c.) given to the

ATYPICAL PNEUMONIA: NUMBER OF DAYS IN HOSPITAL WITH TEMPERATURE OF 99.6° OR OVER IN 420 CASES

	No. of Cases	Percentage
1 to 3 days	200	48.1
4 to 6 days	96	22.8
7 to 9 days	38	9.0
10 to 12 days	14	3.2
13 to 15 days	5	1.1
Over 15 days	7	1.6
No fever	60	14.2
Total	420	100.0

Table 10

ATYPICAL PNEUMONIA: DAYS IN HOSPITAL

	No. of Cases	Percentage
1 to 7 days	9	2.1
8 to 14 days	53	12.6
15 to 21 days	126	30.0
22 to 28 days	99	23.6
29 to 35 days	55	13.1
36 to 42 days	31	7.4
43 to 49 days	21	5.0
Over 50 days	26	6.2
Total	420	100.0

Table 11

ATYPICAL PNEUMONIA: PHYSICAL FINDINGS IN 400 CASES

Physical Findings	No. of Cases	Percentage
Rales only	124	31.00
Breath sound changes and rales	83	20.75
Breath sound changes, dullness and rales	71	17.75
Dullness and rales	42	10.50
Breath sound changes only	35	8.75
Clear to examination	23	5.75
Friction rub	13	3.25
Breath sound changes and dullness	6	1.50
Dullness only	3	.75
Total	400	100.00

Table 12

more seriously ill patients appeared beneficial. Sixteen patients in all were transfused. Twelve received one transfusion, one patient received two, and three were given three each. In one case blood was received from three patients convalescing from atypical pneumonia; this convalescent blood had no appreciable superiority over ordinary transfusions. Where there had been considerable weight loss, poly-vitamins seemed to lessen the period of convalescence. In 2 cases of atypical pneumonia (not reported in this series) complicated by pericarditis, the use of penicillin has appeared helpful. None of the patients in this series received penicillin.

Initially sulfonamides were used on all cases. Altogether, 134 (31.7 per cent) of the 420 received sulfonamides; of these 76 were given sulfathiazole, 52 sulfadiazine, and 6 a combination of both drugs. Despite blood levels ranging from an average of 3 to 8 mg. per cent up to 10 or 12 mg. per cent there was no improvement attributable to sulfonamides.

As most of these patients were admitted before the inauguration of the Reconditioning Service (May 1944), few of them participated in this facility. However, they were all given some form of physical rehabilitation prior to returning to full duty. The program in effect on the pneumonia wards was as follows: all patients remained in bed until afebrile 5-7 days; during the next week they were allowed to get up gradually till by the 12-14th day afebrile they were up constantly. During the next week these patients were given duties on the ward requiring increasing muscular exertion and then sent directly to duty. The more severe cases were kept a week or more longer depending upon the rate of convalescence. In only 19 cases were sick leaves given; these varied from 10 days (2 cases) to 14-15 days (16 cases) to 21 days in a single case.

It is regretted that all of the cases could not be followed clinically for six to eight months. There were 40 cases (9.5 per cent) readmitted to the hospital at intervals varying from less than a week to over 12 months and in this group of readmissions there were no recurrences of pneumonia.

REPORT OF FATAL CASE

A 20-year-old Negro corporal, entered the hospital October 29, 1942, complaining of severe pain in his right chest. He had been ill for one week with a dry cough and malaise; on the day prior to admission he developed sharp pains in the right chest which were aggravated by deep inspirations. There had been no chills. The patient had influenza in 1931; the history was otherwise negative.

The patient appeared acutely ill despite a temperature of 99.0° F. The pulse was 96 and respirations were 32. The pharynx was hyperemic. Definite "splinting" of the right chest was noted with increased tactile fremitus and dullness; no rales were audible. Blood pressure was 100/76 and the heart sounds were normal.

The red cell count was 4,500,000 with 75 per cent hemoglobin; the white cell count was 7,550 with 72 per cent neutrophils and 28 per cent lymphocytes. Urinalysis was negative. The patient was unable to raise any sputum for examination. X-ray showed increased density with mottling at the right lower lobe.

There were two distinct phases of the patient's illness. During the first phase he had the usual relatively mild course of an atypical pneumonia with clinical and x-ray evidence of recovery. The second phase was sudden in onset, with progressive pulmonary involvement terminating in death.

The initial, severe thoracic pain subsided after one day. Sulfonamides were administered with little apparent effect on the severity or course of the illness. Temperature was never over 102.4°; the pulse was

Fig. 1

Bedside plate taken a few hours after admission, showing density at right lower lobe. (Illustration is reversed, patient's right side is on left.)

usually slow, ranging from 68 to 90 despite the fever. On the third hospital day, rales were easily heard at the right base and these persisted for 4 days. By the seventh hospital day the patient's chest was clear and he was afebrile. On the twelfth day he was allowed to be up gradually until by the nineteenth day he was up almost constantly. On that day a roentgenogram showed that the lungs had cleared completely.

On the twentieth hospital day the patient suddenly

Fig. 2
X-ray on nineteenth day showing complete resolution.

Fig. 4
X-ray on twenty-ninth day showing right pleural effusion with slight mediastinal shift towards the left.

Fig. 3
Film on twenty-first day with dense clouding right lower lobe and infiltration at left lower lobe angle. This and all subsequent films made at bedside.

Fig. 5
Plate on thirtieth day following thoracentesis with injection of small amount of air. (Illustration is reversed, the patient's right side is on the left.)

developed a severe pain in the right lower chest, his temperature rose to 101.2° F., and he began expectorating thick, rusty sputum. On examination there was dullness, diminished breath sounds, and rales at the right lower lobe. Laboratory studies showed 8,800 white blood cells with 73 per cent neutrophils, 25 per cent lymphocytes, and 2 monocytes. Urinalysis was negative; blood cultures were obtained, but no organisms were found. An x-ray of the chest revealed dense clouding of the right lower lobe and infiltration of the left lower lobe.

The patient was again given sulfadiazine, but as he showed no appreciable improvement after 4 days, chemotherapy was discontinued.

Coughing, which had begun with the relapse, persisted for the remainder of the patient's illness. Although the first expectoration was described as rusty, all subsequent sputa were purulent with occasional blood streaks. Repeated examinations failed to show significant numbers of pneumococci and there were no fungi, mycetes, nor tubercle bacilli.

The temperature during the last 18 days varied from normal to as high as 103.4° but usually was only 99 to 101.° The pulse rate ranged from 80 to 110 with a few notations of 120-130. The respiratory rate became increasingly rapid and labored.

By the twenty-fifth day, there was evidence of extension of the pneumonic process to the right middle and upper lobes with a right pleural effusion. On the thirtieth day, 350 c. c. of yellow, slightly turbid fluid were removed from the right thoracic cavity. Cultural and microscopic studies revealed no organisms.

The patient's condition became steadily worse. Respiratory distress increased and on the thirtieth day he was placed in an oxygen tent. He experienced severe paroxysms of coughing, which lasted 30-60 minutes despite morphine, and during these attacks he raised several drams of foul, purulent sputum. Blood studies showed an increasing anemia and, on the thirty-eighth day the patient developed leukocytosis for the first time. On the thirty-ninth hospital day the patient became incontinent of urine and feces and suddenly expired.

AUTOPSY

Gross Examination.—On removal of the sternum, an encysted pocket containing 4 c. c. of yellow fluid was found between the right lung and the mediastinum. A few c. c. of pus were noted in the right pleural cavity. Over the right pleura were numerous adhesions, which formed many locules containing yellowish, purulent fluid. The right upper and middle lobes were moderately collapsed and on section the cortical portions of these lobes were lighter red, subcrepitant, and slightly indurated. The right lower lobe on cross-section was rather dry, yellowish gray, with mildly dilated bronchi.

The left lung presented a smooth and glistening pleural surface. On section this lung was dark red and moderately moist; in the left lower lobe area there were numerous small, shotty areas of induration. These areas on section appeared more granular than the rest of the lung. Except for a slightly enlarged spleen with a tense capsule, the rest of the gross examination was not remarkable.

Microscopic Examination.*—Several sections of the lungs were examined. The primary features appeared to be a chronic bronchitis and bronchiolitis. The bronchi contained necrotic purulent exudate; the lining was irregularly ulcerated, and the walls were thickened by a prominent round and plasma cell infiltration. This infiltration extended radially from the bronchi, causing a thickening of the alveolar septa. The air spaces in large portions of the lung examined were partially collapsed and lined by a cuboidal epithelium. Most of the alveoli contained a predominantly mononuclear cell exudate, but in patchy areas, the exudate was frankly purulent with much fibrin. In one section in which the pleura was markedly thickened as a result of organization of a fibrino-purulent exudate, the alveolar septa were markedly thickened by fibrosis as well as by a prominent round cell infiltration.

There was cloudy swelling of the liver and kidneys. The spleen showed marked hyperplasia of the cells of the pulp and the follicles were small and poorly defined. In the adrenals, mild depletion of the cortical lipoid was observed; the cortical cells were mildly fragmented by edema and small numbers of them were necrotic. Examination of the testes revealed marked atrophy of the spermatogenic tissue.

The other organs including the brain appeared microscopically normal.

Opinion of the Pathologist.—This case appeared to be a primary interstitial pneumonitis which became secondarily complicated, resulting in bronchopneumonia and the other chest findings listed. Associated anatomical findings are cloudy swelling of the liver, kidneys, and adrenals; acute splenic tumor; and testicular atrophy.

SUMMARY AND CONCLUSIONS

(1) Atypical pneumonia has been of increasing clinical interest since 1935. This disease has been especially important to the military forces because of the time such cases spend in hospitals.

(2) Inasmuch as no etiologic agent has been proven, the diagnosis of atypical pneumonia is based on clinical observation. Significant diagnostic points include x-ray changes with minimal physical findings, negative sputum, relatively normal leukocyte count, low pulse rate, and the failure to respond to sulfonamides.

---

*Microscopic examination and pathological opinion are by Major Ira Gore, Thayer General Hospital.

(3) A detailed analysis of 420 cases with the case report of one fatal case is presented. Cases were studied in regard to diagnosis on admission, symptomatology, physical findings, laboratory and x-ray studies, clinical course, complications, and treatment.

(4) There was no appreciable correlation between the incidence of common respiratory infections and atypical pneumonia during a 27-month period studied.

(5) Despite the minimal physical findings as compared with x-ray evidence of pulmonary involvement, daily examination of the chest during the acute phase of illness in atypical pneumonia showed some physical findings in 94.25 per cent of the cases studied.

(6) Complications, unusually mild in this group, included extension of the pneumonic process, pleural involvement, and delayed resolution.

(7) The treatment of atypical pneumonia is symptomatic. Although sulfonamides are valueless, in the more severely ill patients, oxygen and transfusions are helpful. In the treatment of complicated cases, penicillin deserves further evaluation.

(8) Physical rehabilitation, requiring gradually increasing muscular activity in patients convalescing from atypical pneumonia is of utmost importance in returning military personnel to full duty.

REFERENCES

1. Allen, W. H.: Acute Pneumonitis. Ann. Int. Med., **10**:441 (Oct.) 1936.
2. Blades, B.; and Dugan, D. J.: Pseudo Bronchiectasis Following Atypical Pneumonia. Bull. U. S. Army Med. Dept. No. 70 p. 60 (Nov.) 1943.
3. Bowen, A.: Acute Influenzal Pneumonitis. Amer. J. Roentgenol., **34**:168 (Aug.) 1935.
4. Campbell, E. T.: Primary Atypical Pneumonia & Malaria. War Medicine, **3**:249 (March) 1943.
5. Campbell, T. A.; and Strong, P. S.; Grier, G. S.; and Lutz, R. J.: Primary Atypical Pneumonia. J.A.M.A., **122**: 723 (July 10) 1943.
6. Commission on Acute Respiratory Diseases: Atypical Pneumonia. Amer. J. Med. Sci., **209**:55 (Jan.) 1945.
7. Curtzwiler, F. C.; and Moore, B. E.: Primary Atypical Pneumonia of Unknown Etiology. Radiology, **40**:347 (April) 1943.
8. Dingle, J. H.; Abernethy, T. J.; Badger, G. F.; Buddingh, G. J.; Feller, A. E.; Langmuir, A. D.; Ruegsegger, J. M.; and Wood, W. B.: Primary Atypical Pneumonia, Etiology Unknown. War Medicine, **3**:223 (March) 1943.
9. Fredd, H.: Atypical Pneumonias, New York State J. Med., **41**:34 (Jan.) 1941.
10. Gallegher, J. R.: Acute Pneumonitis: A Report of 87 Cases Among Adolescents. Yale J. Biol. and Med., **13**:663 (May) 1941.
11. Glendy, R. E.; Beaser, S. B.; and Hankins, W. D.: Primary Atypical Pneumonia of Unknown Cause with Unusual Manifestations and Complications. Arch. Int. Med., **75**:30 (Jan.) 1945.
12. Goodrich, B. E.; and Bradford, H. A.: The Recognition of Virus Type Pneumonia. Amer. J. Med. Sci., **204**:163 (Aug.) 1942.
13. Haight, W. L.; and Trolinger, J. H.: Primary Atypical Pneumonia, Etiology Unknown. U. S. Nav. M. Bull., **41**:989 (July) 1943.
14. Higley, C. S.; Warren, H. A.; Harrison, R. S.: Complications of Primary Atypical Pneumonia. Bull. U. S. Army Med. Dept. No. 83 p. 67 (Dec.) 1945.
15. Karpel, S.; Waggoner, I. M.; McCowm, O. S., Jr.: Primary Atypical Pneumonia. Ann. Int. Med., **22**:408 (March) 1945.
16. Kasich, M.; and Cohen, I. S.: Primary Atypical Pneumonia. J. of Med. Soc. N. J., **40**:358, 1943.
17. Meakins, J. F.: Primary Atypical Pneumonia of Unknown Etiology. Canad. M. A. J., **48**:333, 1943.
18. Murray, M., Jr.: Atypical Bronchopneumonia of Unknown Etiology. N. E. J. Med., **222**:565 (4 April) 1940.
19. McCarthy, P. V.: Primary Atypical Pneumonia of Unknown Etiology. Radiology, **40**:344 (April) 1943.
20. McNaught, J. B.: Virus Pneumonia: A Review of the Pathology. Cal. and Western Med., **59**:220 (Oct.) 1943.
21. McNeil, C.: The Relationship of Cold Agglutinins to the Course of Primary Atypical Pneumonia. Amer. J. Med. Sci., **200**:48 (Jan.) 1945.
22. Owen, C. A.: Primary Atypical Pneumonia. Arch. Int. Med., **73**:217 (March) 1944.
23. Racker, E.; Rose, S. P.; and Tumen, A. O.: Pneumococcic Pneumonia Resembling Primary Atypical Pneumonia. A. J. Med. Sci., **209**:496 (April) 1945.
24. Reimann, H. A.: Viral Pneumonia. Bull. New York Acad. Med., **17**:187 (March) 1941.
25. Reimann, H. A.; and Havens, W. P.: An Epidemic Disease of the Respiratory Tract. Arch. Int. Med., **65**:138 (Jan.) 1940.
26. Reimann, H. A.: An Acute Infection of the Respiratory Tract with Atypical Pneumonia. J.A.M.A., **111**:2377 (Dec. 24) 1938.
27. Rhoads, P. S.: The Probable Incidence and Clinical Features of "Virus" Pneumonia. Radiology, **40**:327 (April) 1943.
28. Saphir, O.: Pathological Changes in So-Called Atypical Pneumonia. Radiology, **40**:339 (April) 1943.
29. Schmitz, R. C.: Primary Atypical Pneumonia of Unknown Cause. Arch. Int. Med., **75**:222 (April) 1945.
30. van Ravenswaay, A. C.; Erickson, G. C.; Reh, E. P.; Siekierski, J. M.: Pottash, R. R.; and Gumbiner, B.: Clinical Aspects of Primary Atypical Pneumonia. J.A.M.A., **124**:1 (Jan. 1) 1944.

SPINAL FLUID PROTEIN IN THE RETROSPECTIVE DIAGNOSIS OF SUBCLINICAL POLIOMYELITIS*

By M. B. ANDELMAN, M.D.,
WILLIAM I. FISHBEIN, M.D.,
Chicago, Illinois
and
ALBERT E. CASEY, M.D.
Birmingham, Alabama
Under the direction of
HERMAN N. BUNDESEN, M.D., Sc.D.
Chicago, Illinois

In a coordinated study of poliomyelitis in Chicago during the summer and fall of 1945 four

*Received for publication March 22, 1946.

*From the laboratories of the Chicago Health Department and the Birmingham Baptist Hospitals.

The work was aided by a grant from the Cook County Chapter of The National Foundation for Infantile Paralysis. The paper was presented at the Atlantic City meeting of the American Society for Experimental Pathology, March 12, 1946.

epidemiologic procedures were incorporated into the studies of contacts, non-contacts and controls of poliomyelitis patients. The first consisted of careful investigation and reinvestigation of the case histories of all children living in the various neighborhoods under study. Detailed histories were supplemented when possible by the other three methods and the results of this case history method have been reported.[1] The second epidemiologic procedure was the use of daily temperature studies on children who were the most intimate contacts of infectious poliomyelitis patients, and on comparable children who were non-contacts in the same neighborhood or controls in distant neighborhoods.[2] Each procedure was supplemented as far as possible by the other three. The third procedure was the use of spinal fluid examination 10 to 60 days after the onset of fever among contacts, non-contacts and controls. The elevation of spinal fluid protein in children presumed to be convalescing from subclinical poliomyelitis is the excuse for this third paper, of which a preliminary note has been presented.[3] The fourth epidemiologic procedure, namely virus studies, through the collection of nose, throat, mouth and stool specimens on contacts, non-contacts and controls is yet not sufficiently completed for publication.[4]

Materials and Methods.—The details and general plan of the studies are presented in the first paper of the series.[1]

Of the 142 spinal fluid examinations reported in this study, 136 were made under the supervision of Dr. A. L. Hoyne at the Chicago Municipal Contagious Disease Hospital by Drs. R. Brown, M. Albright, M. Hernandez, H. Parker, P. Orland, and E. Winfield of the hospital staff. The spinal fluid protein, chloride and glucose determinations were made in the laboratories of the Chicago Health Department by Messrs. Frank V. Silver and Lee Troth; senior chemists. The chemists had no knowledge of the clinical condition, Pandy or cell counts when their determinations were made. The remaining 6 spinal fluid examinations were done at the Cook County Hospital on patients admitted to that institution.

One hundred and nine of the 142 children were a part of the field study on poliomyelitis. The remaining 33 children included all those admitted to the Municipal Contagious Disease Hospital between July 2 and October 18, 1945, (mostly suspected of having on admission prodromal poliomyelitis) who were proven to have a great variety of illnesses, (*Table 4*) which from their nature and after thorough study, seem unlikely to have been confused with poliomyelitis. It will be noted that diseases with definite central nervous system involvement, such as mumps, meningitis, and encephalitis were omitted from this group. Also about 30 children were eliminated upon whom poliomyelitis was not proven but who were tagged with a final diagnosis of pharyngitis or tonsillitis; some of these may have been poliomyelitis.

The 109 children in the field study were distributed as follows: 48 were paralytic cases (39 are listed in *Table 3* and 9 among the first 12 in *Table 1*) and on 4 of these spinal fluid protein values are not available; 19 were non-paralytic cases (15 are listed in *Table 5* and 4 in *Table 1*) of the meningitic type admitted to the hospital and classified as such. Nine of the paralytic and four of the meningitic cases of poliomyelitis occurred among the 43 intimate contacts of poliomyelitis patients (*Table 1*) upon whom spinal puncture was available. The remaining 30 contact children had delayed spinal fluid examinations made because from the history or daily temperature record they were suspected of having had subclinical poliomyelitis. All such suspected children who were brought to the hospital for spinal puncture are included in the table.

As would be expected, a larger number of suspects were not examined by spinal puncture because of failure to obtain parents' consent. It was much easier to obtain parents' consent for hospitalization of children suspected of having poliomyelitis than it was among non-contact and control children, even though the minor illness was in several instances compatible with poliomyelitis. Consequently, spinal fluid examination is available on only 12 non-contact and control children (*Table 2*). All of these except the four children of one family had had a proven acute illness. Two of the illnesses (NCDoDos, ages 1½ and 2½) were frank coryza with running nose and cough; only one had fever. There was no headache or other symptoms indica-

SPINAL FLUID DETERMINATIONS ON FEBRILE CONTACTS OF POLIOMYELITIS PATIENTS

Case	Name	CSA	Onset	Ce	Pr	Pa	Gl	Ch	Date	Int
18	RoFye	wf3	8/20	45	68	tr	68	724	8/21	1
48	MaTho	wf6	9/15	88	47	0	48	714	9/17	2
5	WiSha	wm7	8/5	36	44	1+	68	704	8/7	2
11	WaWeb	wm3	8/5	100	68	tr	63	698	8/8	3
5	KaSha	wf2	7/27	79	64	2+	51	714	7/30	3
5	JeSha	wf9	7/28	35	43	tr	69	734	8/1	4
38	RoDah	wm8	8/17	220	76	1+	81	704	8/21	4
6	JaMiz	wm3½	8/1	130	56	tr	68	724	8/6	5
48	MaBry	wf31	8/18	290	84	4+	81	688	8/23	5
139	DaBec	wf3	9/27	2	31	0	63	704	10/3	6
82	MiEnr	wm3	8/22	8	72	1+	51	708	8/30	8
18	RiMoo	wm3	8/3	40	52	tr	55	714	8/13	10
38	GlDah	wm7	8/20	1	45	0	69	724	9/1	11
38	RiSpe	wm7	8/22	9	68	tr	95	694	9/4	11
11	KeGos	wm8	8/14	1	40	0	69	694	8/31	17
38	DoDah	wf6	8/14	2	46	0	74	738	9/1	18
5	PaSha	wf10	7/23	13	115	2+	58	714	8/11	19
18	WiDah	wm2½	8/11	0	30	0	65	734	8/31	20
11	JoWeb	wm5½	8/15	10	70	4+	95	754	9/4	20
11	PaWeb	wf11	8/14	2	60	0	89	694	9/4	21
5	LeLaF	wm1½	8/6	4	52	0	74	744	8/29	23
18	LeMoo	wf7	8/5	0	64	0	57	714	8/31	26
5	ChOrr	wf5	8/10	4	50	—	58	734	9/6	27
38	GeSpe	wm2	8/7	18	48	tr	45	734	9/4	28
11	EiWeb	wf7	8/6	6	56	tr	100	704	9/4	29
5	DoNei	wm10	8/9	3	76	tr	53	734	9/14	36
11	NoGos	wf13	7/28	0	52	0	109	718	9/4	38
48	WiEnr	wm3½	8/27	0	27	0	55	734	10/4	38
48	CaAol	wf10	8/27	2	39	tr	66	724	10/8	42
38	DiKow	wf7	7/22	0	60	tr	63	694	9/3	43
5	RoIsa	wm9½	7/15	7	48	0	55	734	8/29	45
14	ErJoh	wm10	8/19	4	22	0	53	704	10/4	46
6	DeSto	wm11	8/18	0	25	0	60	714	10/3	46
36	GeLMa	cf8	8/24	2	29	0	60	704	10/10	47
36	EdMax	cm1	8/24	0	29	0	60	714	10/10	47
17	LiJoh	cf5½	8/18	2	19	0	74	734	10/10	53
52	JeBon	wm4	8/13	1	35	+	63	704	10/5	53
52	FrGey	wm3	8/12	0	20	0	55	734	10/5	54
6	DoMiz	wf6	8/7	2	39	0	65	704	10/3	57
6	KeWes	wm3	8/7	0	29	0	66	714	10/3	57
6	JeMcG	wm7½	8/7	5	27	0	65	714	10/3	57
6	EdMcG	wm5½	8/2	0	29	0	66	704	10/3	62
6	MaMcG	wf3½	8/1	1	25	0	63	704	10/3	63

Table 1

tive of poliomyelitis. The 1½-year-old had red cells in the spinal fluid and this may account for the level of 44 mg. for the spinal fluid protein. The six remaining children had no signs or symptoms of illness and were considered well by their parents and by the visiting nurses and pediatricians. Consent for spinal puncture was granted only because axillary temperatures of 99 to 99.6° had been noted on daily visits of the field nurse. Each of three children (FrMar, EdLam, AlWil) had 99° on two different days, two (VaWal, VaIve) had 99.4° on a single day, and one (GeMik) 99.6° on a single day. It transpired that two of the six (GeMik, EdLam) were subjected to spinal puncture too late for any practical value. Four children in one family lived across a narrow street some 60 feet from 3 acute cases and were examined because the parents of the respective families maintained the children had not played with each other. However, several months after these children were examined as non-contacts a neighbor woman maintained that she had seen the children of the respective families playing together at or around the time the poliomyelitic children were becoming ill. This again was denied by the children and parents involved. A question is placed, therefore, in the table as to whether these were truly non-contacts but left in this column. The interval for the four children is the period plus 12 days theoretical incubation period from the time of supposed exposure to spinal fluid examination.

In connection with the difficulties of persuading the parents to have the children examined the authors were assisted greatly by Drs. Abrams and Lander, and nurses Altiere, Ross and Korwin of the field staff for particular efforts in this regard.

The method of estimating the spinal fluid protein was that of Denis and Ayer, and Ayer, Daily, and Fremont-Smith.[5,6]*

The statistical methods in the evaluation of

---

*Use 420 filter and colorimeter "lamp brighter" on Evelyn photo-electric colorimeter.

Place 15 ml. water into colorimeter tube in Evelyn and adjust "Galv" to 100. Remove tube and read "Galv" for center reading (Reading = 68).

Remove water from tube as completely as possible and add:

1 ml. spinal fluid of centrifuged sample.

6.5 ml. water.

2.5 ml. 5 per cent sulpho salicylic acid. Invert 6 times.

Let stand at least 10 min.

Adjust "Galv" to above center reading. (68).

Convert "Galv" voltage reading to per cent mgs. protein on attached chart and value obtained, by 2, since method was standardized with 2 ml. of serum and only 1 ml. spinal fluid was used.

For light PPT. add:

0.5 ml. spinal fluid.

7.0 ml. water.

2.5 ml. 5 per cent sulpho salicylic acid.

Multiply chart reading by 4 = mgs. total protein in 100 ml. sample.

For heavy PPT. add:

0.5 ml. spinal fluid.

14.5 ml. water.

5.0 ml. 5 per cent sulpho salicylic acid.

Multiply chart reading by 8 = mgs. total protein in 100 ml. sample.

For very heavy PPT. add:

0.25 ml. spinal fluid. Procede as for "Heavy PPT." as above. Multiply chart reading by 16 = mgs. total protein in 100 ml. sample.

SPINAL FLUID DETERMINATIONS ON NON-CONTACT AND CONTROL CHILDREN

Case	Name	CSA	Onset	Ce	Pr	Pa	Gl	Ch	Date	Int
51L	FrMar	wf11	9/10	0	49	0	42	714	10/1	21
44L	VaWal	wm7	9/7	4	22	0	58	718	9/29	22
18N	DoDos	wf2½	8/11	0	36	0	68	698	9/6	26
18N	DoDos	wm1½	8/7	3	44	0	63	708	9/6	30
31L	AlWil	cm2	8/29	—	34	—	59	714	10/1	33
18N?	JoFar	wm2	0	1	43	0	51	714	9/29	43?
18N?	MaFar	wf5½	0	16	45	0	48	708	10/1	43?
18N?	JaFar	wm4½	0	0	39	0	55	714	10/1	43?
18N?	PaFar	wf3	0	3	27	0	59	714	10/1	43?
25L	VaIve	wf2½	8/21	3	27	0	51	714	10/5	45
9L	GeMik	wf2½	8/12	15	21	0	48	714	10/1	49
6N	EdLam	wm12	8/6	1	27	0	66	714	10/3	58

Table 2

SPINAL FLUID DETERMINATIONS ON PARALYTIC CASES OF POLIOMYELITIS

Case	Name	CSA	Onset	Ce	Pr	Pa	Gl	Ch	Date	Int
113	RaSha	cm2	9/6	200	22	0	62	760	9/6	0
14	JeJac	cf9	8/9	340	86	2+	68	734	8/10	1
21	LoMcJ	wf25	8/13	280	64	2+	65	708	8/14	1
36	JaMax	cm3	8/15	45	22	+	59	—	8/16	1
30D	AnFre	wf6	8/16	258	104	3+	69	714	8/18	2
58D	MaBer	wf11	8/22	560	100	4+	65	694	8/24	2
80D	CaSal	wf3	8/28	7	60	2+	89	718	8/30	2
139	ChFox	wf12	9/18	6	47	3+	60	708	9/20	2
12	NaAut	wf8	8/5	270	76	4+	63	694	8/8	3
88D	JoCie	wm7	8/27	—	26	—	79	720	8/30	3
107	NiDia	wm10	8/27	0	26	0	44	700	8/30	3
127	FrSwi	wm16	9/14	6	48	1+	45	724	9/17	3
184	NaGre	wf12	10/2	18	39	tr	78	714	10/5	3
201	RoOls	wm12	10/14	163	72	2+	66	714	10/17	3
37	RoAug	wm6	8/16	35	56	tr	65	694	8/20	4
39	JoHar	wm8	8/17	12	112	1+	65	694	8/21	4
49	MuPol	wf26	8/18	250	156	4+	69	694	8/22	4
51	DeBas	wf15	8/19	41	80	4+	78	694	8/23	4
76	PhBre	wm11½	8/25	200	36	4+	63	698	8/29	4
145	JoCoy	wf14	9/18	114	66	3+	69	724	9/22	4
189	DeShe	wf4	10/5	55	47	3+	60	—	10/9	4
29	EvPet	wf8	8/13	268	144	4+	94	714	8/18	5
31	RoSch	wm19m	8/12	21	—	—	—	—	8/17	5
125	WiCTh	wm7	9/12	80	34	2+	36	734	9/17	5
142D	CaHeg	wf8	9/16	—	54	—	74	734	9/21	5
81	RiGer	wf16	8/24	50	140	2+	63	694	8/30	6
152	DoRot	wm19	9/18	14	96	2+	65	698	9/24	6
177	PaCal	wm33	9/27	210	—	1+	—	—	10/3	6
185D	KeHil	wm6	9/30	9	—	0	89	—	10/5	6
101	MiSul	wm12	8/30	40	100	2+	—	—	9/6	7
123	MaWag	wf16	9/8	136	93	4+	42	694	9/15	7
94	SuSch	wf9	8/27	126	112	2+	109	674	9/4	8
100	TePet	wm11	8/29	11	48	tr	54	714	9/6	8
138	CaWro	wf8	9/12	36	31	4+	60	708	9/20	8
203	ChMcC	wm5	10/7	97	60	4+	60	714	10/16	9
1	NiRap	wm15	7/8	90	92	4+	84	724	7/19	11
7	LaLai	wf21	7/26	205	160	1+	56	724	8/6	11
13?	MeFer	wm3	7/27	180	32	3+	65	724	8/9	13
52D	KaGey	wf26	8/17	—	—	—	—	—	—	—

Table 3

mean differences include calculation of the variance, the standard error of the mean and the use of the "t" tables to be found in the book by Fisher.[7] Statistical significance is taken to be present when the chance of a difference happening by accident is calculated to be less than once in each 100 times ($P = 0.01$—).

RESULTS

Data on the 142 spinal fluid examinations are presented for the 43 febrile contacts of poliomyelitis patients, (*Table 1*) for the 12 non-contact and control children, (*Table 2*) for the 48 paralytic cases of poliomyelitis (39 are in *Table 3* and 9 in *Table 1*), for the 33 children

SPINAL FLUID DETERMINATIONS ON CHILDREN WITH ACUTE CONDITIONS SEEMINGLY INCOMPATIBLE WITH POLIOMYELITIS

Name	Ce	Pr	Pa	Gl	Ch	Date	Disease
ChRod	—	28	—	84	714	7/2	Acute osteomyelitis
JoAqu	1	34	tr	79	734	7/6	Bronchitis
GNova	8	36	0	66	694	8/17	Bronchitis
ElHoo	120	26	2+	69	714	7/11	Broncho pneumonia
HaWil	10	25	0	83	714	7/16	Broncho pneumonia
DoLat	0	20	0	86	748	8/15	Pneumonia
PaEva	5	44	ft	91	710	8/8	Tetanus
SaRuf	4	39	0	83	806	10/19	Tetanus
ArKau	7	22	0	105	714	10/18	Laryngitis
AuMcG	4	18	0	50	754	9/29	Laryngitis
EJanc	1	23	0	55	734	9/15	G. I. Upset
PaSid	1	46	0	74	714	9/27	G. I. Upset
ChSid	16	40	0	79	714	9/27	G. I. Upset
JoToc	20	30	0	81	708	9/27	G. I. Upset
Cnadr	0	27	0	74	734	10/5	G. I. Upset
BNadr	0	24	2	55	734	10/5	G. I. Upset
PaHaw	0	20	0	55	714	10/5	G. I. Upset
JSwva	0	40	0	65	708	9/10	Arthritis
HHand	2	36	0	54	714	9/11	Arthritis
OTerr	5	27	tr	76	708	9/19	Neuritis
CaKar	10	40	0	67	754	7/11	Neuritis
DePet	4	38	1+	86	734	7/26	Pertussis
VeBoj	2	18	0	58	714	8/7	Pertussis
AnWei	0	24	0	68	718	7/30	Septicemia
ElFra	3	30	0	68	698	8/7	Pyelitis
LDarc	9	36	tr	60	734	8/20	Otitis media
FeRom	4	72	0	81	724	8/27	Malaria
JTupo	2	36	0	125	738	9/4	Fractured hip
SGrab	6	56	0	76	714	9/4	Diarrhea
JWals	4	27	0	22	734	9/21	Scarlet fever
APete	6	30	0	56	694	9/25	Measles
HeWin	3	34	0	74	698	10/16	Rheumatic fever
NeAgu	1	42	0	67	680	9/29	Rheu. fever, pharyngitis

Table 4

with acute conditions seemingly incompatible with poliomyelitis (*Table 4*) and for 19 patients with meningitic poliomyelitis (15 are in *Table 5* and 4 in *Table 1*). The interval in *Tables 1, 2, 3,* and *5* is that period in days between the onset of the illness and the date of spinal fluid puncture. The "date" in the tables represents the day of the spinal puncture, and data are given for the cell count, protein, glucose, chloride levels and the Pandy. In *Table 1* the group with intervals from 11 to 63 days represents persons suspected of having had "subclinical" poliomyelitis because of the histories or because of a temperature of 99 to 99.8° detected during the daily visits of the field nurses. As has been reported by others, no differences between the paralytic, meningitic and sub-clinical cases were noted for the spinal fluid glucose or chloride values. The spinal fluid cell count was more than 5 on only 6 of the 31 children with supposed sub-clinical poliomyelitis examined more than 11 days after the onset of illness. The Pandy was not positive sufficiently long to be of great clinical significance. The spinal fluid protein levels varied among the different groups of children. The protein values are plotted for the subclinical and the paralytic cases in *Fig. 1.* The average values for the paralytic and supposed subclinical poliomyelitic patients are plotted in *Fig. 2.* The dotted line represents assumed protein values for those periods for which no data are available. It might seem that the total protein level in patients with paralytic and those with subclinical poliomyelitis are similar and emphasizes the lack of correlation between the spinal fluid cells and the protein values. It will be noted that the spinal fluid protein reaches a peak from the fifth to the twelfth day and that the level is generally above 45 mg.* even in the supposed subclinical cases of poliomyelitis for as late as 45 days after the onset of illness.

From the standpoint of the field study it is significant that the spinal fluid protein was elevated above normal 11 to 45 days after onset in 15 of 19 patients (79 per cent) who from the clinical history or temperature studies were suspected of having developed poliomyelitis within 21 days after known exposure to infectious patients. None of the 12 patients suspected of having subclinical poliomyelitis had an elevated protein level when spinal puncture was made between 45 and 65 days after the onset. This is expressed graphically in *Fig. 3.* In the same figure it may be seen that 9 per cent of the 33

*Spinal fluid cell counts of more than 5 per cmm. and spinal fluid protein of more than 45 mg. are considered abnormal.

SPINAL FLUID DETERMINATIONS ON PATIENTS WITH "MENINGITIC" POLIOMYELITIS

Case	Name	CSA	Onset	Ce	Pr	Pa	Gl	Ch	Date	Int
96	ThCle	wf16m	9/1	300	49	0	48	740	9/2	1
17	RiJoh	cm4	8/9	260	48	4+	79	708	8/10	1
25	LiMar	wf3	8/15	520	38	4+	50	714	8/17	2
59	NaAhl	wf9	8/22	—	19	—	45	—	8/24	2
77	PaKor	wm10	8/26	170	64	3+	100	710	8/29	3
8	CoBer	wf9	8/3	52	56	tr	53	734	8/6	3
23	LyHam	wf3	8/11	27	43	4+	68	724	8/15	4
24	BeBre	wf9	8/12	56	68	1+	71	714	8/16	4
103	MaBan	wf5	8/31	12	72	3+	52	694	9/6	6
73	RoSal	wm16	8/20	130	128	4+	84	714	8/27	7
83	WaHic	wm2	8/23	7	68	1+	54	714	8/30	7
86	DoKam	wm3	8/24	80	64	4+	71	674	8/31	7
4	EuMit	wm4	7/20	4	112	4+	60	714	7/30	10
16	RoHan	wm3	8/3	80	92	3+	71	734	8/13	10
9	WiFre	wm7	7/22	150	40	0	57	650	8/2	11

Table 5

control children with acute febrile illness incompatible with poliomyelitis had elevated spinal fluid protein when examined 1 to 10 days after the onset of fever. This contrasts with a spinal fluid protein elevation among 75 per cent of the 12 children examined 1 to 10 days after developing poliomyelitis after known contact with an infectious patient (see *Table 1* and *Fig. 3*). Likewise, the protein level was raised 11 to 45 days after onset of the fever in 79 per cent of 19 contacts suspected of having subclinical poliomyelitis. Only 1 of 10 non-contact and control children examined 11 to 45 days after the onset of illness had spinal fluid protein elevated above 45 mg.

A study of the average protein levels between the various groups indicates differences of statistical significance. The mean spinal fluid protein values for the 44 children with paralytic poliomyelitis was 70.4 mg. (var. 1232), for the 17 children with meningitic poliomyelitis 63.3 mg. (var. 103), for the 19 children with subclinical poliomyelitis examined 11 to 45 days after the onset 55.1 mg. (var. 356), for the 10 non-contacts and control children examined 11 to 45 days after presumed onset of illness 36.6 mg. (var. 17), for the 33 children admitted to the M.C.D.H. with acute febrile illnesses considered incompatible with poliomyelitis 33.0 mg. (var. 125) and for the 12 patients suspected of having subclinical poliomyelitis examined 45 to 63 days after the onset of illness 27.3 mg. (var. 34). There was no statistically significant difference between the mean protein levels of the paralytic and meningitic (difference = 7.1 $\angle$ 4.7, t = 1.49, P = 0.13); nor between the mean protein levels of the non-contacts and controls from the field study and the 33 control children admitted to the hospital with other illnesses (difference = 3.6 $\angle$ 1.9, t = 1.9, P = 0.06). There was a statistically significant difference however, between the paralytic and meningitic cases examined about 4 days after onset and the 19 children with subclinical poliomyelitis examined between 11 and 45 days, averaging 27 days, and, of course, with all of the other groups with levels within normal limits. Likewise, the 19 children with subclinical poliomyelitis examined on an average of 27 days after onset had significantly higher levels than either

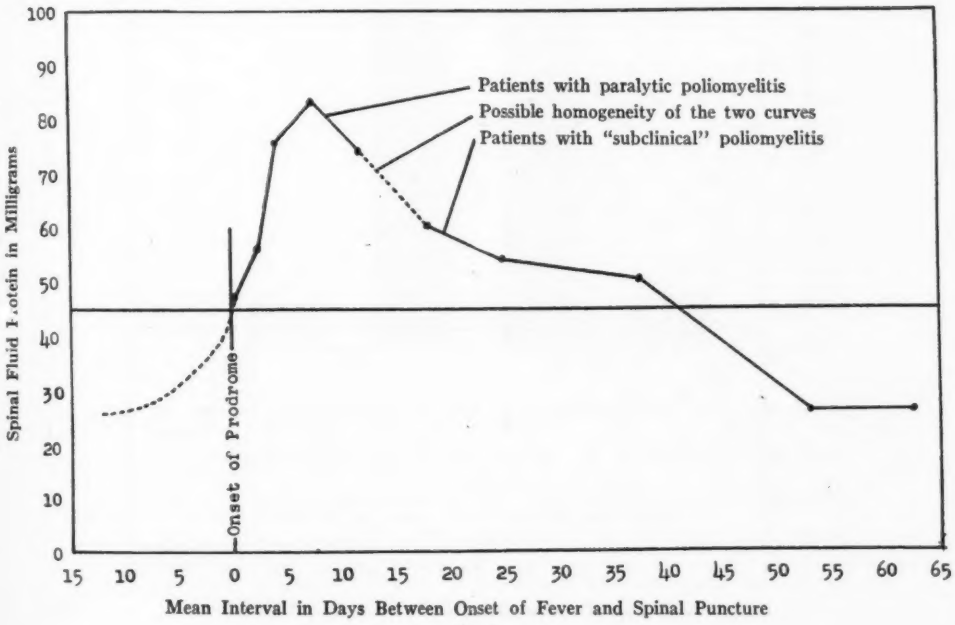


Fig. 1

set of control children or the 12 children suspected of having sub-clinical poliomyelitis but examined 53.5 days after onset. Also the two control groups having mild febrile illnesses which were probably not poliomyelitis each had a statistically higher level than the 12 recovered children examined 53.5 days after onset and having a level of 27.3 mg. It is of interest, therefore, that although children with febrile illnesses other than those which affect the nervous system rarely have spinal fluid protein levels over 45 mg., nevertheless, there is a small but significant rise above normal. This possibly is associated with the immunity mechanism of the body.

DISCUSSION

Peabody, Draper and Dochez[8] reported in 1912 that the spinal fluid globulin was increased in 28 out of 43 poliomyelitis patients during the first week; 40 out of 45 from the eighth to the fourteenth day; 37 out of 39 from 15 to 21 days; 28 out of 33 from 22 to 28 days; in 16 out of 21 from 29 to 34 days. It was also noted that the cell count usually dropped to normal or nearly normal after the first two weeks. It was stated that the spinal fluid globulin was of utmost value as an aid to the diagnosis both in preparalytic and in abortive cases. (However, the only non-paralytic children with positive globulin were examined by the authors during the first week). It was also pointed out that

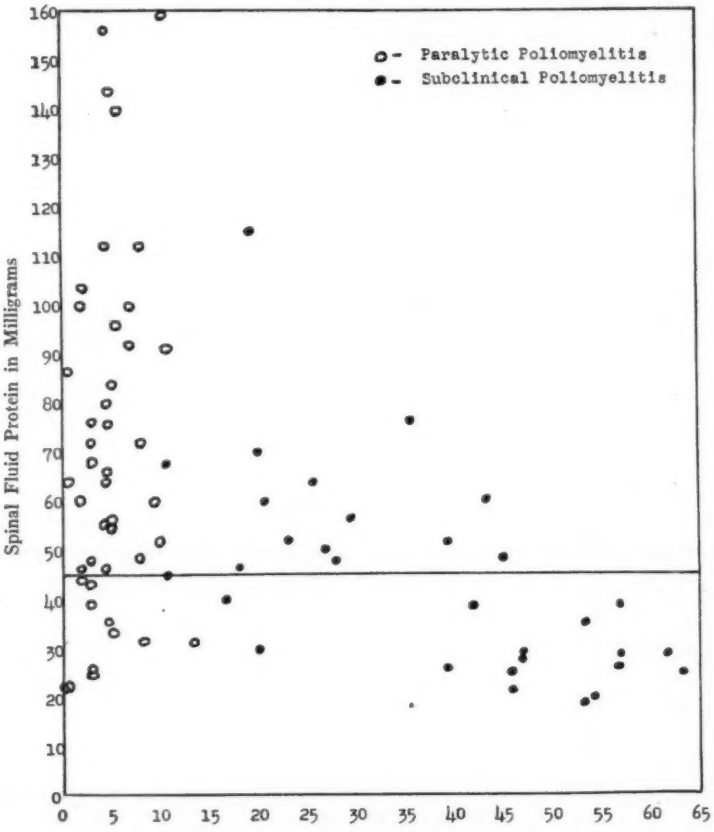


Fig. 2

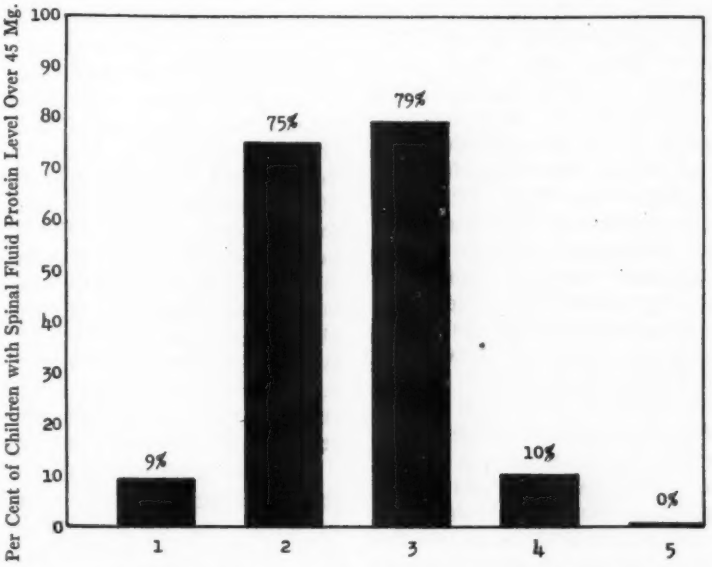
there seemed little correlation between the spinal fluid globulin and the cell count. Ten of their cases were examined within the first three days after the onset of symptoms; all but one had a cell count of 37 or over, yet 6 of the 10 gave a negative globulin.

In 1913, Fraser[9] reported that in 362 spinal fluid examinations on 126 poliomyelitic patients at the Hospital of the Rockefeller Institute, the spinal fluid globulin was above normal in 49 per cent of 84 cases in the first week; 68 per cent of 79 cases in the second week; 70 per cent of 56 cases in the third week; 56 per cent of 37 cases in the fourth week. The cell count was increased above normal in 93 per cent during the first week in 84 cases; 65 per cent in the second week in 79 cases; 32 per cent in the third week in 56 cases; and 27 per cent in the fourth week in 37 cases. Over 10 cells per cu. mm. were considered abnormal. Globulin was determined by the butyric acid method of Noguchi.[8]

In 1917 Zingher[10] reported:

"For 8 to 10 weeks after onset a majority of persons having an attack of poliomyelitis will show an increased amount of both albumin and globulin. This is strongly suggestive of an attack of the disease during an epidemic, especially with a history of some or all of the preparalytic symptoms." There was shown "rather strikingly a persistence of the albumin increase [The globulin is generally in proportion to the albumin method] even as late as 8 weeks after the onset of symptoms. It is interesting to note that the maximum amount of albumin is found in a much larger proportion of cases during the second week rather than during the first week of the disease. It is possible, therefore, to clear up the diagnosis of the abortive type of poliomyelitis even during the later stages of convalescence."

For over 30 years, therefore, it has been



(1) 33 control children with acute febrile illness incompatible with poliomyelitis examined 1 to 10 days after onset of fever.

(2) 12 contact children with poliomyelitis examined 1 to 10 days after onset of fever. (Same neighborhoods as Nos. 3, 4 and 5.)

(3) 19 contact children suspected as having "subclinical" poliomyelitis examined 11 to 45 days after onset of fever. (Same neighborhoods as No. 2.)

(4) 10 non-contact and control children examined 11 to 45 days after onset of illness considered not to be poliomyelitis.

(5) 12 contact children suspected as having "subclinical" poliomyelitis examined 46 to 63 days after onset of illness.

Fig. 3

recognized that the spinal fluid protein, both albumin and globulin, is increased for as long as 5 to 8 weeks after onset with a peak during the second week, as in our own results. It was also recognized that the cells and the protein curves are entirely different and it was proposed by both Peabody, Draper and Dochez and by Zingher that abortive cases of poliomyelitis could be studied by the determination of the protein content. Zingher was especially definite in stating that abortive cases could be studied during the convalescent period by this method. However, the authors have been unable to find, in spite of the clear cut results and logical recommendations of these early authors, that spinal fluid determinations in a systematic manner have been utilized in field investigations relating to the epidemiology of poliomyelitis. It seems inconceivable that the method has not been used but no reference has been found to it.*

The fact that the spinal fluid protein was increased when examined during the appropriate period in 15 of 19 patients (79 per cent) in our series who were suspected of having poliomyelitis of the abortive or subclinical form is indicative of the accuracy not only of the spinal fluid as an indicator but also of the value of careful neighborhood investigations and reinvestigations and of daily axillary temperature determinations as epidemiological procedures. Peabody, Draper and Dochez obtained increased spinal fluid globulin in only 75 per cent of the patients with known paralytic poliomyelitis whereas our results were equally good with "subclinical" poliomyelitis. It is possible, however, that the total protein method which we have used is more satisfactory than the butyric acid methods of Noguchi[8] used by the former authors. Also if 25 per cent of known paralytic cases had no spinal fluid protein increase 11 to 35 days after onset may it not be reasonable to assume that most of the 25 per cent of suspected subclinical cases with normal spinal fluid protein levels were also poliomyelitis cases?

The fact that mild or unrecognized poliomyelitis gives an increased spinal fluid protein which may be detected 11 to 35 days after onset and the absence of such an increase in infectious diseases without central nervous system manifestations probably indicates that unrecognized lesions of the central nervous system did occur in the subclinical types of the disease. The disease was, therefore, not "mild" by any yardstick and presumably gives a good immunity since the spinal fluid protein increase was approximately as high in this late period in subclinical as in paralytic cases. Increased spinal fluid protein is not proof of poliomyelitis but it probably amounts to almost that when careful neighborhood investigations and axillary temperature studies suggest the subclinical form in a neighborhood having a paralytic case and an apparent absence of any other virus disease there at the time.

It is also remarkable that although spinal fluid levels are routine in public health laboratories in many parts of the country more usable data have not been published on the total protein curves in poliomyelitis and in other diseases.

In perusal of the literature one encounters statements about the transmission of the disease by healthy carriers. The authors wish to emphasize that there was sufficient evidence that the transmission of the disease could very readily be explained in the Chicago neighborhoods in 1945 by contact with a poliomyelitis patient during his infectious period.[1 11 12] Again it should be pointed out that "subclinical" poliomyelitis is the ordinary form of the disease and should be termed poliomyelitis. This type represented about 79 per cent of the cases;[2] the meningitic type only 13 per cent; the paralytic form only 6.0 per cent; and the fatal type only 0.7 per cent. Even of the paralytic group only 2.3 per cent remain permanently paralyzed.

It is our belief that the symptomatology of the disease and the entire clinical picture should be revised and the presence of stiff neck or paralysis have little bearing on the differential diagnosis. Running nose, diarrhea, and cough generally contraindicate poliomyelitis although each of these may occur in about 1 in 20 cases, and it is believed that an illness with these symptoms should not be termed poliomyelitis without virus studies or the presence of paralysis.[1 2] The occurrence of other virus diseases in the neighborhood should lead to caution in the diagnosis of poliomyelitis.

*The attention of the authors to the prolonged increase in the spinal fluid protein level in poliomyelitis was due to personal communication with Dr. S. O. Levinson.

The authors do not like the word abortive used in regard to mild forms of poliomyelitis since this intimates that the patient planned to become paralyzed but for some reason or other failed to make the grade. Our belief is that if the term abortive is to be used at all it should be used for paralytic and meningitic cases since these are unusual and unforeseen manifestations in the course of ordinary poliomyelitis.

SUMMARY

From a coordinated epidemiologic, clinical and laboratory study of poliomyelitis 142 spinal fluid examinations are analyzed on 43 contacts of infectious poliomyelitic patients who subsequently (within 5 to 21 days after exposure) developed illness which was either outright poliomyelitis or mild fevers suspected of being this disease, and on 45 non-contacts and controls who developed febrile illnesses which were not believed to have been poliomyelitis; also on 39 patients with paralytic and 15 with meningitic forms of the disease who were not included in the above.

The spinal fluid protein level was above 45 mg., averaging 55.1 mg. in 15 of 19 (79 per cent) contact children suspected of convalescing from subclinical poliomyelitis. These were examined 11 to 45 days after the onset of the illness. However in 12 contact children examined 45 to 65 days after the onset of the illness the spinal fluid was within normal limits in each instance and averaged 27.3 mg. Only 10 per cent of 43 control children having acute illnesses other than those primarily affecting the central nervous system had spinal fluid protein elevated above 45 mg. although the general level was significantly raised to 33 mg. A base line of 27 mg. was found for recovered poliomyelitic patients some 50 to 60 days after onset. A homogeneous curve of protein variation was plotted from the exposure to a poliomyelitis patient until the return to normal some 55 days later.

CONCLUSIONS

(1) The increase in the spinal fluid protein in subclinical poliomyelitis confirms the accuracy not only of the spinal fluid protein as an indicator but also the value of careful neighborhood investigations and reinvestigations and daily axillary temperature determinations as epidemiological procedures among contacts of infectious patients.

(2) The remaining 20 or 25 per cent of contact children suspected of convalescing from subclinical poliomyelitis but who had no increase in spinal fluid 11 to 45 days after onset may nearly all have been suffering from the disease, since 20 to 25 per cent of known paralytic cases have normal spinal fluid protein levels during the same period.

(3) Although the determination of spinal fluid protein levels was recommended or proposed by early workers as a means of detecting nonparalytic poliomyelitis in the convalescent period, this study seems the first report of its application in a systematic field study.

(4) The consistent and prolonged rise of the spinal fluid protein level in subclinical poliomyelitis (equal to that in the paralytic form) indicates that this form of the disease is not "mild," that it is possibly accompanied by lesions of the central nervous system, and that it is sufficient to give rise to a lasting immunity.

(5) The fact that the spinal fluid protein level was increased in only 9 to 10 per cent of non-contact and control children suffering from acute illnesses corroborates by a third epidemiologic procedure the already published thesis that poliomyelitis is infectious to susceptible child contacts certainly to the degree of 80 per cent and probably to the degree of 90 to 100 per cent, placing it in the category of measles.

The authors wish to express their appreciation to Miss Mary Gay Clower, Research Secretary, and to Mrs. M. Robinson for their assistance in the preparation of the manuscript and compilation of the tabular material.

BIBLIOGRAPHY

1. Casey, Albert E.; Fishbein, William I.; and Bundesen, Herman N.: Transmission of Poliomyelitis by Patient to Patient Contact. J.A.M.A., **129**:1141-1145 (Dec. 22) 1945.
2. Casey, Albert E.; Fishbein, William I.; Abrams, Irving; and Bundesen, Herman N.: Relative Frequency of "Subclinical" Poliomyelitis. Daily Temperature Studies on Intimate Contacts of Infectious Patients. To be published.
3. Andelman, M. B.; Fishbein, William I.; Casey, Albert E.; and Bundesen, Herman N.: Spinal Fluid Protein in the Retrospective Diagnosis of Subclinical Poliomyelitis. Fed. Proc., **5**:218 (Mar.) 1946 (Soc. Exp. Path.)
4. Gordon, Francis B.; et. al.: To be published.
5. Denis, W.; and Ayer, J. B.: A Method for the Quantitative Determinations of Protein in Cerebrospinal Fluid. Arch. Int. Med., **26**:436-442 (Oct.) 1920.
6. Ayer, J. B.; Daily, Mary E.; and Fremont-Smith, F.; Denis-Ayer Method for the Quantitative Estimation of Protein in the Cerebrospinal Fluid. Arch. Neur. and Psych., **26**:1038-1042 (Nov.) 1931.
7. Fisher, R. A.: Statistical Methods for Research Workers. Oliver and Boyd, Edinburgh, 1938.
8. Peabody, Francis, W.; Draper, George; Dochez, A. R.: A

Clinical Study of Acute Poliomyelitis. Monograph No. 4, The Rockefeller Institute for Medical Research. New York, 1912.
9. Fraser, Francis B.: A Study of the Cerebrospinal Fluid in Acute Poliomyelitis. J. Exp. Med., **18**:242-251 (May) 1913.
10. Zingher, Abraham: The Diagnosis and Serum Treatment of Anterior Poliomyelitis. J.A.M.A., **68**:817-823 (March 17) 1917.
11. Casey, Albert E.: Observations on an Epidemic of Poliomyelitis. Science, **95**:359-396 (Oct.) 1941.
12. Aycock, W. L.; Kessel, J. F.; and Gordon, J. E.: The Infectious Period of Poliomyelitis and Virus Detection. Amer. J. Med. Sci., **205**:454-465 (March) 1943.

THE TREATMENT OF EARLY SYPHILIS WITH PENICILLIN*

By J. Lamar Callaway, M.D.
Durham, North Carolina
Ray O. Noojin, M.D.
Birmingham, Alabama
Beatrice H. Kuhn, M.D.
Durham, North Carolina
Kathleen A. Riley, M.D.
Durham, North Carolina
and
Arthur H. Flower, Jr., M.D.
Durham, North Carolina

Since the effectiveness of penicillin in the treatment of early syphilis in human beings was first demonstrated in a preliminary report by Mahoney, Arnold and Harris[1] in December, 1943, a number of publications of a preliminary nature have appeared. No attempt will be made to evaluate all of the current literature. Moore[2] and Callaway and Noojin[3] have summarized chemotherapy in syphilis and rapid treatment methods which establish background information on the treatment of syphilis prior to penicillin therapy. Eagle and Mussleman[4] have reported on the spirochetal action of penicillin *in vitro*, and Walsh and his co-workers[5] have carefully studied the time-dose relationship of penicillin therapy. Other recent reports on penicillin treatment of early syphilis are those of Mahoney and his co-workers,[6] Moore, et alii,[7] Binkley, Kile and collaborators,[8] Nelson and Duncan,[9] Noojin, Callaway and Flower,[10] Wise and Pillsbury,[11] Leifer,[12] Schoch and Alexander,[13] and others.

Since May, 1944, all patients admitted to Duke Hospital having early syphilis have been treated with penicillin. Patients were unselected and qualified for penicillin therapy if a diagnosis of dark-field positive syphilis could be established and reasonable assurance could be obtained that at least a two-year follow-up might be secured.

A total of fifty-one patients has been treated and of these forty are being actively followed at the present time. It should be remembered that data based on forty patients may not be statistically significant but information obtained should at least show a trend and help in the over-all evaluation.

All patients upon admission to the hospital were completely evaluated from a medical standpoint. Repeated dark-field examinations were carried out; routine and quantitative serologic tests for syphilis were obtained; and spinal fluid examination was done before therapy was started. After penicillin therapy was instituted all patients receiving 1,200,000 units of penicillin had dark-field examinations done at hourly intervals until three successive dark-field examinations were negative for Treponema pallidum.

All data given in this discussion are calculated on observations of the forty patients actively followed. We do not feel justified in including any available information on the patients who have lapsed from observation. All follow-up statistics are calculated on the length of time between the first day of therapy and the date of the patient's last visit to the hospital.

Of the forty patients, nine were found to have dark-field positive primary syphilis, twenty-eight had dark-field positive secondary syphilis and three patients presented dark-field positive mucocutaneous relapses.

Thirty of these patients were treated with 1,200,000 units of sodium penicillin (30,000 units in distilled water given intramuscularly every three hours for forty injections). Of the thirty patients six had primary syphilis, one had

*Received for publication March 30, 1946.

*From the Division of Dermatology and Syphilology, Department of Medicine, Duke University School of Medicine, Durham, North Carolina.

The work described in this paper was done under a contract recommended by the Committee on Medical Research between the Office of Scientific Research and Development and Duke University, Durham, North Carolina.

a mucocutaneous relapse and twenty-three had secondary syphilis. The remaining ten patients received 2,400,000 units of sodium penicillin (20,000 units in distilled water given intramuscularly every three hours for one hundred and twenty injections). Of these, three had primary syphilis, five had secondary syphilis and two had mucocutaneous relapse. Nineteen of these patients were white and twenty-one were Negro, twenty were male and twenty were female.

Primary Syphilis.—Nine patients with dark-field positive primary syphilis were treated (*Table 1*). One patient was seronegative at the onset of therapy and has remained seronegative. Eight patients were seropositive. All nine patients are now seronegative and clinically well. Six patients treated with 1,200,000 units of sodium penicillin became seronegative in one to four hundred and eight days, averaging two hundred and eleven days. Three patients treated with 2,400,000 units of sodium penicillin became seronegative in fifteen to one hundred and three days, averaging sixty-eight days. No patient in this group has developed a serologic or clinical relapse, reinfection or neurorecurrence. Since therapy no patient in this group has become pregnant.

Mucocutaneous Relapse.—Three patients were given penicillin who on admission were found to have a dark-field positive mucocutaneous relapse following previous chemotherapy. No patient in this group has become seronegative. One patient who was given 1,200,000 units of penicillin developed a second dark-field positive mucocutaneous relapse on the sixty-first day after penicillin therapy and was retreated. This patient had received 1,200,000 units of penicillin. The other two patients have been retreated for syphilis of the central nervous system and will be considered in more detail later.

Secondary Syphilis.—Twenty-eight patients with dark-field positive, seropositive secondary syphilis have been treated. Fourteen, or fifty per cent, of these patients are now seronegative. Thirteen of the fourteen received 1,200,000 units of penicillin and became seronegative in one hundred and sixty-two to four hundred and seventy-four days, with an average of two hundred and ninety-five days. One patient received

OVER-ALL SUMMARY OF 40 PATIENTS WITH EARLY SYPHILIS TREATED WITH PENICILLIN

Diagnosis	No. of Pts.	Penicillin Dosage In Million Units	Febrile Herxheimer Reactions No. Per Cent		Hours Darkfield (—) After Therapy Started	No. of Pts. Sero (—) After Penicillin Therapy No. Per Cent		Days Necessary to Become Sero (—)	No. of Pts. Sero (+) At This Time No. Per Cent		Days Sero (+)	Relapse Or Re-Infect	Persistent (+) C.S.F. or Neuro-recurrence
Primary Syphilis	6	1.2	3	50	0-11 Av. 5.7	6	100	1-408 Av. 211	0			0	0
	3	2.4	1	33	No data	3	100	15-103 Av. 68	0			0	0
Secondary Syphilis	23	1.2	9	39	1-13 Av. 5	13	56.5	162-474 Av. 295	10	43.5	173-557 Av. 403	1	3
	5	2.4	2	40	No data	1	20	76 Av. 76	4	80	73-351 Av. 170	1	0
Mucocutaneous Relapse	1	1.2	1	100	4 Av. 4	0		0	1	100	173	1	0
	2	2.4	0		No data	0		0	2	100		0	2
Total	40		16		1-13	23		1-474	17			3	5

Table 1

2,400,000 units of penicillin and became sero-negative in seventy-six days. Three of these patients have been delivered of full term pregnancies since the completion of therapy and will be considered in more detail later.

Fourteen patients, or fifty per cent of this group, continue to be seropositive. Ten of these patients were treated with 1,200,000 units of penicillin and have been followed for an average of four hundred and four days. Four patients received 2,400,000 units and have been followed for an average of one hundred and seventy days. Two patients in this group have been delivered of full term pregnancies after the termination of therapy. Two patients have developed a mucocutaneous relapse, and three patients have a persistently positive cerebrospinal fluid Wassermann or have had a neuro-recurrence. *Table 2* shows in detail the serologic follow-up on nine of these fourteen patients who are sero-resistant. Of these nine patients, three are showing a satisfactory trend toward serologic negativity, the latest examination showing a Kahn titer of one unit in each. Two patients have been retreated with 2,400,000 units of penicillin. Because of persistent sero-resistance three are scheduled for retreatment as soon as hospitalization is available. The remaining patient in this group is being followed for consideration of retreatment.

Dark-field Examination.—All patients who received 1,200,000 units of penicillin were followed with serial dark-field examinations done at hourly intervals, starting one hour before the

PENICILLIN RESISTANT SECONDARY SYPHILIS

Patient Number	Diagnosis	Treatment	Adm. Titer	Follow-up Titered Kahn Units: Calendar Months After Treatment																	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Sec. Syph. DF (+)	1.2 Units	2560	384					80		80		48										40
				(To be retreated)																			
2	Sec. Syph. DF (+)	1.2 Units	80	24														40				20	20
				(To be retreated)																			
3	Sec. Syph. DF (+)	1.2 Units	80	40		5	6						2	10	5		20	20	20		20*		
				(*Admitted for retreatment)																			
4	Sec. Syph. DF (+)	1.2 Units	384	192	160	48	48		12	40	5	6	1	6	2	5	10	5		5*			
				(*Admitted for retreatment)																			
5	Sec. Syph. DF (+)	1.2 Units	160	40	10		1		40	40		10					1						
6	Sec. Syph. DF (+)	1.2 Units	320	160	40					1			1		1				1				
7	Sec. Syph. DF (+)	2.4 Units	80	12							80		80	80*									
				(*To be retreated)																			
8	Sec. Syph. DF (+)	2.4 Units	48	20	20	10	6	5	5	1													
9	Sec. Syph. DF (+)	2.4 Units	80		10	5	5	24															

Table 2

beginning of therapy and continuing until three successive negative dark-field examinations had been obtained. Six patients with dark-field positive primary syphilis became negative in from zero to eleven hours, with an average of five and seven-tenths hours. Twenty-three patients with secondary syphilis became dark-field negative in from one to thirteen hours, with an average of five hours. One patient with a mucocutaneous relapse became dark-field negative in four hours. No serial dark-field examinations were done on patients treated with 2,400,000 units of penicillin although the diagnosis on all patients thus treated was established by repeated dark-field examinations prior to therapy.

Reactions During Therapy.—The only significant clinical reaction seen was a febrile reaction occurring during the first twenty-four to forty-eight hours of therapy. Forty per cent of the patients receiving 1,200,000 units of penicillin developed a febrile Herxheimer reaction; thirty per cent of those receiving 2,400,000 units of penicillin likewise developed a febrile Herxheimer reaction. Forty-four per cent of the patients with primary syphilis, thirty-seven per cent of those with secondary syphilis and thirty-three per cent of those with a mucocutaneous relapse showed this clinical reaction to therapy.

Febrile reactions were classified into four grades: Grade 1, 37.3 to 38.2; Grade 2, 38.3 to 39.2; Grade 3, 39.3 to 40.2; Grade 4, 40.3 and above. Nine patients had a Grade 1 febrile response. All of these patients were treated with 1,200,000 units. Two of these patients had primary syphilis, six secondary syphilis and one a mucocutaneous relapse. Five patients had a Grade 2 febrile Herxheimer; four received 1,200,000 units and of these one had primary syphilis and three had secondary syphilis. One patient with secondary syphilis received 2,400,000 units. One patient had a Grade 3 febrile response. This patient was treated with 2,400,000 units of penicillin and had secondary syphilis. One patient with primary syphilis developed a Grade 4 febrile response after having received 2,400,000 units of penicillin.

Relapse.—In this series of forty patients there have been three presumed infectious relapses (*Table 3*). The term presumed infectious relapse is based on criteria outlined by Schoch and Alexander[14] and by Moore[15] in their discussions on infectious relapse and re-infection.

The first infectious relapse occurred in a nineteen-year-old colored single male who was first seen with a dark-field positive, seropositive penile lesion of four weeks duration. He gave a history of having had syphilis in 1942, at which time he received some thirty injections of an arsenical and thirty-two injections of bismuth. His last sexual exposure had been one month before the current penile lesion developed. He was hospitalized and given 1,200,000 units of penicillin over a four-day period. His quantitative Kahn test before therapy was reported as 320 units, and at the time of his discharge five days later it was 640 Kahn units. Increase in serologic titer during penicillin therapy was not an unusual occurrence. One month later he was clinically well and had a Kahn test of 384 Kahn units. Two months after penicillin therapy he again presented a dark-field positive penile lesion with a generalized papular eruption. His Kahn test was reported as 320

RELAPSE AFTER PENICILLIN TREATMENT

Diagnosis	Penicillin Dosage in Million Units	Blood Serologic Titer in Kahn Units											*Disposition
		Before Therapy	Weeks After Treatment										
			1	2	3	4	5	6	7	8	9	10	11	
Secondary syphilis dark-field (+)	1.2	24	96	12	5				40*					To Rapid Treatment Center. Had dark-field (+) vulvar lesion
Mucocutaneous relapse darkfield (+)	1.2	320	384	320	96	12					5	5	1*	Retreated here with dark-field (+) mucocutaneous relapse

			Days After Treatment					
			62	67	73	79	87	95
Secondary syphilis dark-field (+)	2.4	20	1*	0	1	10	40	12

Table 3

units. He was readmitted to the hospital with a second infectious relapse and was given an additional 1,200,000 units of penicillin over a four-day period. Following this his serologic titer began to drop and two hundred and seventy-three days following his second course of penicillin therapy his quantitative Kahn test was one unit. Clinical and spinal fluid examinations have continued to be normal.

The second presumed infectious relapse occurred in a twenty-year-old colored single woman with dark-field positive secondary syphilis and condyloma lata. She received 1,200,000 units of penicillin over a four-day period. Her pre-treatment blood serologic titer revealed twenty-four Kahn units and her post-treatment Kahn titer was 240 Kahn units. At the end of three months the Kahn titer had dropped to five Kahn units, and six months after therapy quantitative blood serologic studies revealed forty Kahn units. She gave a history of sexual exposure and had a dark-field positive vulval lesion of one week duration. Although the vulval lesion was at a different site from the previous one and re-infection was suspected, relapse could not be eliminated.

The third patient in this group, a possible relapse, a twenty-seven-year-old white male was admitted with seropositive secondary syphilis with a blood serologic titer of twenty Kahn units. His spinal fluid Wassermann reaction upon admission to the hospitatl was positive in 0.6 c. c. The remainder of his physical examination and laboratory studies were normal. He was given 2,400,000 units of penicillin over a fifteen-day period and was discharged clinically well. Forty days after therapy had been terminated he appeared with a secondarily infected penile ulcer of one week's duration, giving a history of re-exposure. However, repeated dark-field examinations were negative and serologic examinations revealed one Kahn unit. On the fiftieth day the lesion continued to be dark-field negative, and the quantitative serologic test was negative. He was readmitted to the hospital with a quantitative Kahn titer of ten units and a generalized papulosquamous eruption. Cerebrospinal fluid examination before and during his second hospitalization was negative. On the seventy-ninth day after original penicillin therapy, he was given 4,800,000 units of penicillin over a fifteen-day period.

Pregnancies.—Five patients have been delivered of full term pregnancies at intervals of two, four, six, nine and fourteen months respectively after having received 1,200,000 units of penicillin (*Table 4*). The patient delivering fourteen months after therapy was seronegative at the time of delivery, and the child was seronegative at the time of birth and at the age of two months. The child and the mother are both normal in every respect after sixteen months observation.

Those patients delivering two and four months after therapy did not become seronegative until after delivery. Their children were seronegative at birth and are still negative at the ages of eight and ten months respectively. Physical examinations in both cases have been entirely normal.

The patients who delivered six and nine

EFFECT OF PENICILLIN TREATMENT ON PREGNANT WOMEN AND SYPHILIS IN THE NEWBORN

Diagnosis	Penicillin Dosage in Million Units	No. of Mos. After Start of Therapy Baby Born	Blood Serologic Tests in Kahn Units																			
			Before Therapy	After Therapy	Follow-up Serologic Studies After Penicillin Rx (Mos.)																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Secondary syphilis dark-field (+)	1.2		2,560	640	384					80		80		48										40
	Baby	9												10										1280
Secondary syphilis dark-field (+)	1.2		80	80	24														40				20	20
	Baby	6								0														
Secondary syphilis dark-field (+)	1.2		96	160	20	20	6	6	0	1	0	0	0		0	0	0	0	0					
	Baby	14																	0		0			
Secondary syphilis dark-field (+)	1.2		40	40	30													0						
	Baby	4				0												0						
Secondary syphilis dark-field (+)	1.2		40		80	10					0		0		0	0	0	0						
	Baby	2				0			0					0										

Table 4

months after therapy are still seropositive and will be retreated with penicillin as soon as possible. The first child negative at birth passed into the custody of the father and is reputably normal on physical examination and is said to be seronegative, but we have been unable to obtain a specimen of blood for examination in our laboratory. The second child who had a serologic test for syphilis of ten Kahn units at birth was lost from follow-ups for ten months, at which time she reappeared with a serologic titer of 1,280 Kahn units, annular syphilids of the skin and a positive spinal fluid Wassermann reaction in 0.1 c. c. These cases are summarized in *Table 4*. Detailed study of a large series of pregnant women as reported by Ingraham and associates[16] and by Goodwin and Moore[17] show the efficiency of penicillin therapy in preventing the development of prenatal syphilis.

PERSISTENTLY POSITIVE CEREBROSPINAL FLUID OR NEURORECURRENCE

In our series of forty patients, seven were found to have a positive spinal fluid Wassermann reaction before therapy was started. Two of these patients were diagnosed originally as presenting a mucocutaneous relapse and five as having secondary syphilis. Five of these seven patients were found again to have a positive spinal fluid on an average of three hundred and sixteen days after therapy was started (*Table 5*).

The first patient, a twenty-seven-year-old white man was admitted with dark-field positive secondary syphilis. Quantitative Kahn tests showed 160 Kahn units. Spinal fluid examination revealed the spinal fluid Wassermann reaction to be positive in a dilution of 0.6 c. c. one cell per cubic millimeter and a colloidal mastic test of 112344. This patient received 1,200,000 units of penicillin in a four-day period, and his blood Kahn test revealed a titer of twenty units. On the five hundred and forty-ninth day after therapy a repeated spinal fluid examination was done, which revealed sixteen cells per cubic millimeter, total proteins 66 milligrams per cent, spinal fluid Wassermann reaction positive in 0.4 c. c. with a negative colloidal mastic test. There were no symptoms of neurosyphilis, but because of the positive spinal fluid Wassermann reaction, he was retreated with 4,000,000 units of penicillin over a ten-day period.

A second patient, a thirty-five-year-old white married woman, was admitted to the hospital with a dark-field positive secondary syphilis with a serologic titer of 160 Kahn units. Spinal fluid examination revealed seven cells, 76 milligrams per cent total proteins, spinal fluid Wassermann reaction positive in 0.6 c. c. with a negative colloidal mastic test. Two months after penicillin therapy, the blood Kahn test had dropped to ten Kahn units with the spinal fluid examination completely normal. On the two hundred and eleventh day following penicillin therapy she was found to have a Kahn titer of fifty units and the spinal fluid revealed ten cells, 110 milligrams per cent total proteins, spinal fluid Wassermann reaction positive in 0.1 c. c. with a colloidal mastic test of 4321000. This patient was readmitted to the hospital and given 4,000,000 units of penicillin over a ten-day period.

The third patient, a twenty-three-year-old white married man, was admitted with dark-field positive secondary syphilis, with a Kahn test of 80 units. The spinal fluid Wassermann reaction was positive in 0.4 c. c. with total proteins 28 milligrams per cent, no cells and colloidal mastic test negative. This patient was treated with 1,200,000 units of penicillin in four days. The Kahn titer slowly fell over a six months period to ten Kahn units, and on the one hundred and seventy-third day the spinal fluid examination revealed twelve cells, total proteins 69 milligrams per cent, spinal fluid Wassermann positive in 0.2 c. c. with a negative colloidal mastic test. Because of the persistent spinal fluid the patient was readmitted and given 4,000,000 units of penicillin over a ten-day period.

The fourth patient, a thirty-eight-year-old white married man, was admitted with dark-field positive mucocutaneous relapse. The blood Kahn test was reported as forty units. The spinal fluid Wassermann reaction was positive in 0.8 c. c., there was one cell per cubic millimeter, 32 milligrams total proteins, and a negative colloidal mastic test. He was given 2,400,000 units of penicillin in fifteen days. Three months after therapy his blood Kahn test revealed two Kahn units with a spinal fluid examination completely normal. Nine months after therapy the blood Kahn was eighty units, spinal fluid Wassermann reaction positive at 0.6 c. c., fifteen cells, total protein 54 milligrams per cent and a negative colloidal mastic test. This patient has been readmitted for further treatment.

The fifth patient in this series is a fifty-one-year-old white widower admitted with a dark-field positive mucocutaneous relapse. On admission the blood quantitative Kahn was eight units. The spinal fluid Wassermann reaction was positive in 0.6 c. c., six cells, total proteins 38 milligrams per cent and a negative colloidal mastic test. He was given 2,400,000 units of penicillin over a fifteen-day period, and at the end of ninety days his blood Kahn test revealed one unit. On the eighth month after penicillin therapy his blood titer had risen to 24 Kahn units, and the spinal fluid Wassermann reaction was entirely negative. Nine months after penicillin therapy the blood serologic Kahn revealed eight Kahn units. The spinal fluid Wassermann reaction was positive in 0.1 c. c. with thirteen cells, total proteins 43 milligrams per cent with a negative colloidal mastic test. This patient was admitted to the hospital and given 4,800,000 units of penicillin.

RESULTS OF THERAPY ON PATIENTS FOUND TO HAVE POSITIVE SPINAL FLUID WASSERMANN REACTION ON INITIAL EXAMINATION

Diagnosis	Penicillin Dosage in Million Units	Initial Laboratory Findings	Follow-up Blood Serologic Titer and Cerebrospinal Fluid Findings After Penicillin Therapy																
			Months After Treatment																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Secondary syphilis dark-field (+) 1.	1.2	Blood: 160 Kahn units C. S. F. Cells: 1 M Pandy: 2 + Protein: Wass.: (+) .6 c. c. C. M.: Neg.			20								10	10	20	12	20	20	5	12 16 M 1 + 66 + .4 c. c. Neg.
Secondary syphilis dark-field (+) 2.	1.2	Blood: 160 Kahn units C. S. F. Cells: 7 M Pandy: 0 Protein: 76 Wass.: (+) .6 c. c. C. M.: Neg.	80	10 0 0 74 Neg. Neg.	20	160	24	320	160 2M-8Pmn 2 + 110 + .1 c. c. 4321000											
Secondary syphilis dark-field (+) 3.	1.2	Blood: 80 Kahn units C. S. F. Cells: 0 Pandy: trace Protein: 28 Wass.: (+) .4 c. c. C. M.: Neg.	80	40	20	20	20 69 + 2 c. c. Neg.	10												
Secondary syphilis dark-field (+) 4.	2.4	Blood: 40 Kahn units C. S. F. Cells: 1 M Pandy: 0 Protein: 33 Wass.: (+) .8 c. c. C. M.: Neg.	80	10	2 1 M 0 57 Neg. Neg.			24			80 3 M 0 19 + .1 c. c. Neg.			40 1 M 0 + .6 c. c. Neg.					
Secondary syphilis dark-field (+) 5.	2.4	Blood: 80 Kahn units C. S. F. Cells: 6 M Pandy: Neg. Protein: 38 Wass.: (+) .6 c. c. C. M.: Neg.	48	10	1		5	1	1	24	80 3 Pmn. Neg. 23 + .1 c. c. Neg.									

Table 5

Two other patients with secondary syphilis were found to have positive spinal fluid Wassermann reactions on admission and have been followed for ninety-five and two hundred and twelve days respectively. The latest examination revealed a negative spinal fluid Wassermann reaction in each.

CONCLUSIONS

(1) Forty patients with early syphilis have been treated with penicillin alone. Thirty patients received 1.2 million units and ten patients received 2.4 million units of aqueous sodium penicillin intramuscularly at three-hour intervals.

(2) Nine patients with primary syphilis (six treated with 1.2 million units in four days and three treated with 2.4 million units in fifteen days) are clinically and serologically well.

(3) Fourteen or fifty per cent of the patients with secondary syphilis treated with penicillin are seronegative. Of the remaining fourteen, three patients have blood serologic titers which are decreasing, three have blood serologic titers which are essentially stationary, three have blood serologic titers which are increasing in intensity, two developed mucocutaneous relapse and were retreated and three patients have been retreated because of persistently positive spinal fluid serologic tests.

(4) None of the three patients with an original diagnosis of mucocutaneous relapse after previous chemotherapy have achieved seronegativity. One of these has developed a second infectious relapse necessitating re-treatment and two patients have been retreated with 4,000,000 units of penicillin because of a persistently positive spinal fluid Wassermann reaction.

(5) Three patients have developed an infectious relapse following penicillin therapy. Two relapsed after 1.2 million units of penicillin and one patient relapsed after 2.4 million units of penicillin.

(6) One of five pregnant women with early syphilis who received 1.2 million units of penicillin gave birth to a syphilitic baby.

(7) Of seven patients who had a positive spinal fluid examination on admission, five have had to be retreated because of a persistent positive spinal fluid Wassermann or because of a neurorecurrence. We believe that if a patient is found to have an active cerebrospinal fluid on the initial examination he should be treated with larger doses of penicillin as having syphilis of the central nervous system rather than as having early syphilis.

ADDENDUM

Results and conclusions described in this report must be evaluated with the full knowledge of the official statement on penicillin in syphilis which appeared in the *Journal of the American Medical Association*, May 4, 1946.

OFFICIAL STATEMENT ON PENICILLIN IN SYPHILIS

The following statement, for release to the press, was prepared jointly on April 22 by Dr. J. R. Heller, Jr., Director of the U. S. Public Health Service, and Dr. J. E. Moore, Chairman, Syphilis Study Section, National Institute of Health, and was approved by Dr. A. N. Richards, Committee on Medical Research, Dr. R. E. Dyer and Dr. Thomas Parran, U. S. Public Health Service, and Dr. R. P. Hargwick, Food and Drug Administration. The statement was released to all leading press services:

The Syphilis Study Section of the National Institute of Health, U. S. Public Health Service, became aware some months ago of the fact that penicillin as commercially prepared contained not one but several penicillins, known as G, X, F and K. Penicillin K has been shown to be of little or no value in syphilis and in certain other infections because, as compared with other penicillins, it is repaidly destroyed in the body. The relative effectiveness of the other penicillins, G, X, and F, has not yet been determined for syphilis or for other infections.

As commercially supplied during recent months the penicillin of some manufacturers, but not of all, has contained substantial though not preponderant amounts of penicillin K. The proportions of K have not been enough to reduce seriously the value of the drug in the treatment of syphilis or in any other infections; and there is no occasion for alarm on the part of physicians who have used it or of patients who have been treated with it. As currently available and employed, penicillin is the best and safest method of treatment of syphilis yet devised. Any patient frightened by newspaper publicity has only to consult his physician or clinic for his usual recheck examination in order to determine his present status.

The situation as to penicillin is a complicated scientific problem under cooperative study both in laboratories and in clinics working under the sponsorship of the National Institute of Health and by industry. Industry has already taken immediate steps to reduce the K content of commercial penicillin and will rapidly apply further scientific information as it becomes available. The public will likewise be informed of important developments as they occur.

BIBLIOGRAPHY

1. Mahoney, J. F.; Arnold, R. C.; and Harris, A.: Penicillin Treatment of Early Syphilis. Am. J. Public Health, **33**:1387 (Dec.) 1943.
2. Moore, J. E.: The Chemotherapy of Syphilis. Am. J. Syph., Gon. and Ven. Dis., **29**:185 (March) 1945.
3. Callaway, J. L.; Noojin, R. O.: Present Day Concepts of the Rapid Treatment of Syphilis. Sou. Med. and Surg., **106**:463 (Aug.) 1944.
4. Eagle, H.; and Musselman, A. D.: Spirochaeticidal Action of Penicillin in Vitro. U. S. Public Health Service. J. Bacteriology, **47**:428, 1944.
5. McDermott, W.; Benoit, M.; DuBois, R.: Time-Dose Relationships of Penicillin Therapy III. Regimens Used in Early Syphilis. Am. J. Syph., Gon. and Ven. Dis., **29**:345 (May) 1945.
6. Mahoney, J. F.; Arnold, R. C.; Sterner, B. L.; Harris, A.; and Zwally, M. R.: Penicillin Treatment of Early Syphilis. J.A.M.A., **126**:63 (Sept. 9) 1944.
7. Moore, J. E.; Mahoney, J. F.; Schwartz, W. H.; Sternberg, T. H.; and Wood, W. B.: The Treatment of Early Syphilis with Penicillin. J.A.M.A., **126**:67 (Sept.) 1944.
8. Binkley, G. W.; and Kile, R. L.: Rapid Treatment of Early Syphilis with Small Doses of Penicillin. Arch. Dermat. and Syphilis, **51**:200 (March) 1945.
9. Nelson, R. A.; and Duncan, L.: Penicillin in the Treat-

ment of Early Syphilis Resistant to Arsenic and Bismuth. Am. J. Syph., Gon. and Ven. Dis., **29**:1 (Jan.) 1945.
10. Noojin, R. O.; Callaway, J. L.; and Flower, A. H.: Favorable Response to Penicillin Therapy in a Case of Treatment-Resistant Syphilis. N. C. Med. J., **6**:1 (Jan.) 1945.
11. Wise, C. R.; and Pillsbury, D. M.: Penicillin in the Treatment of Syphilis Proc. Roy. Soc. Med., **37**:491 (July) 1944.
12. Leifer, W.: The Treatment of Early Syphilis with Penicillin. J.A.M.A., **129**:1247 (Dec. 29) 1945.
13. Schoch, A. G.; and Alexander, L. J.: Treatment of Early Syphilis with Penicillin. J.A.M.A., **130**:696 (March 16) 1946.
14. Schoch, A. G.; and Alexander, L. J.: Reinfection in Syphilis: Newer Concept of Reinfection Encountered with Ten-Day Arsenotherapy of Early Syphilis. Am. J. Syph., Gon. and Ven. Dis., **27**:15 (Jan.) 1943.
15. Moore, J. E.: Editorial: Intensive Arsenotherapy and the Curability of Early Syphilis as Measured by the Criterion of Reinfection. Am. J. Syph., Gon. and Ven. Dis., **27**:108 (Jan.) 1943.
16. Ingraham, N. R.; Stokes, S. H.; Beerman, H.; Lentz, J. W.; and Wammock, V. S.: Penicillin Treatment of the Syphilitic Pregnant Woman. J.A.M.A., **130**:683 (March 16) 1946.
17. Goodwin, M. S.; and Moore, J. E.: Penicillin in Prevention of Prenatal syphilis. J.A.M.A., **130**:688 (March 16) 1946.

EFFECT OF TOPICAL PENICILLIN ON INFECTIONS OF THE UPPER RESPIRATORY TRACT*

By E. E. MENEFEE, JR., M.D.
and
ROBERT J. ATWELL, M.D.
Durham, North Carolina

Infections of the upper respiratory tract are rarely serious but they cause a great loss of productive effort in the population, and consume much of the physician's time. In 1940 we[1] reported on the use of sulfonamides in the treatment of a series of upper respiratory infections. These are commonly used today, but in view of the increasing incidence of sensitivity to the sulfonamides, they should not be used indiscriminately. Hence, as soon as penicillin became plentiful, it seemed wise to use it in place of the sulfonamides. The use of oral penicillin is quite expensive and, at present, debatably effective. Parenteral injection at frequent intervals requires hospitalization, and causes much discomfort to the patient. For these reasons we decided to use topical applications of penicillin.

Sodium penicillin in a dilution of 1,000 units per c. c. of normal saline was used as a mouth wash and gargle and also as a spray. An ordinary hand atomizer was used frequently, but an atomizer powered by compressed oxygen was found to be more efficient.

Coryza.—Sixty-six cases of common colds were treated by thoroughly spraying the nose and throat three to four times a day for three days. Frequently it was necessary to shrink the nasal membranes with one-fourth per cent "neosynephrin" prior to spraying the penicillin. As far as we could determine, the topical penicillin had no effect on the course of the common cold except that in no case treated did sinusitis or purulent infection of the nasal passages develop. From this standpoint it is possible that the usual course of the disease was shortened. Thirty of the cases had a concurrent sore throat. Twenty-six of these reported complete relief of this symptom in twelve to thirty-six hours.

Pharyngitis.—Fifty-one cases of simple sore throat were treated by spraying every three hours. Objectively the signs varied from moderate inflammation of the pharynx to a very slight hyperemia. The duration of symptoms prior to therapy was from one to thirty hours. No patient appeared ill, nor had fever over 38° C. Thirty-nine reported marked improvement within twelve to twenty-four hours. Twelve cases apparently were not helped. It was impossible to do bacteriological studies in all cases, but in fifteen patients throat cultures were done before and after treatment. In six of these, which were not helped by topical penicillin, no predominating organism was found. In the nine cases studied that did respond to therapy, four showed a few beta hemolytic streptococci, three grew large numbers of hemolytic Staphylococcus aureus and two showed nearly pure cultures of alpha hemolytic streptococci.

Septic Sore Throat.—Nine cases of septic sore throat were treated. In all cases the suspected diagnosis was proved by culturing large numbers of beta hemolytic streptococci from the pharynx. All the patients were moderately ill with temperatures ranging from 38.5° C. to 40° C. The average duration of symptoms prior to treatment was six hours. Six patients were treated by spraying the throat and nasopharynx every three hours when awake. All were much improved within twelve hours and apparently well in thirty-six hours. One patient did not

*Received for publication November 29, 1945.

*From the Department of Medicine, Duke University School of Medicine, Durham, North Carolina.

seem improved at the end of twenty-four hours. He was hospitalized and given 10,000 units of penicillin subcutaneously every three hours for eight doses; by this time he was apparently well. Two other cases were hospital employees, and had been admitted as patients at the onset of symptoms. On admission they had been started on sulfathiazole. At the end of thirty-six hours they were afebrile and appeared improved but still complained of a severe sore throat and were unable to swallow solid food. At this time they were started on 10,000 units of penicillin subcutaneously. After thirty-six hours of this they still had much pain and dysphagia. At this time all previous medication was stopped and the patients' throats were sprayed every three hours. After the third spraying, both were much improved and able to swallow without discomfort for the first time in three days.

Carriers.—Following the appearance of a streptococcal wound infection on a surgical floor, all ward personnel had throat cultures and five employees were found to be harboring beta hemolytic streptococci in the nasopharynx. None had any symptoms. These were isolated and the nose and throat sprayed three times per day for two days. Cultures taken then showed no beta hemolytic streptococci. They were examined ten days later and again no pathogenic organisms were found.

Vincent's Angina.—Ten patients were treated by topical penicillin alone. In each case the diagnosis was confirmed by finding numerous fusiform bacilli and spirilla on direct smear. The gums and mucous membranes of the mouth and throat were thoroughly sprayed when they were first seen. Each patient was then given a concentrated, freshly prepared solution of sodium penicillin with directions to dilute it in water to a concentration of 1,000 units per c. c. They were instructed to use this as a mouth wash every three hours and were encouraged to try to hold it in the mouth for at least five minutes each time. Each patient reported marked subjective improvement within twenty-four hours. Four patients who had been unable to eat on account of pain for two days before being seen reported that they felt much better after the third application of the drug and were able to eat without any pain. At the end of forty-eight hours all felt well and objectively the hyperemia, edema, ulceration, membranes and exudation had largely disappeared. Smears became negative in three to five days with an average time of 3.1 days. Two patients had not improved at the end of forty-eight hours of topical treatment. They were then given 25,000 units of penicillin subcutaneously every three hours until 100,000 units had been given. Both appeared well at that time and smears were negative two days later.

One patient apparently failed to respond to local treatment and even after 200,000 units parenterally was not improved. At that time he was given 50 mg. of "mapharsen" and twenty-four hours later he was much improved.

Herpetic Stomatitis.—Four patients with typical herpetic lesions in the mouth and pharynx were treated with topical penicillin every three hours, when awake, for five days. At the end of this time two appeared entirely well, one was improved and one showed no change.

Acute Ethmoiditis.—Seven patients with acute ethmoiditis were treated. All had a purulent nasal discharge which was thought to be secondary to coryza. None had had any previous therapy. Cultures of the nose were done in five cases, and all of these showed heavy growth of hemolytic Staphylococcus aureus. The patients received nasal sprays of penicillin three times a day, preceded by an 0.25 per cent "neosynephrin" spray, for three days. At the end of this time all symptoms had disappeared and there was no longer any discharge.

CONCLUSIONS

One hundred fifty-two patients suffering with infections of the nose and throat were treated with topical penicillin. Therapeutic effects in cases of coryza, a virus infection, were doubtful; but the duration of the symptoms seemed shortened, and no secondary bacterial infection occurred. In cases of simple sore throat, septic sore throat and fusospirochetal infection of the mouth and pharynx, the vast majority of the patients improved rapidly. In no patient treated were any local or systemic toxic reactions noted.

The preparation of the drug is simple; no unusual or expensive equipment is required, and much time and effort should be saved by the

busy practitioner. Since this work was started, penicillin lozenges have been placed on the market, further simplifying the technic of treatment.

REFERENCES

1. Menefee: North Car. Med. Jour., 2:611 (Nov.) 1941.

DELAY IN DIAGNOSING MALARIA AFTER SULFADIAZINE THERAPY*

TWO CASE REPORTS

By SIDNEY G. PAGE, JR., M.D.†

and

JOEL V. MCCALL, JR., M.D.‡

Richmond, Virginia

The anti-malarial effect of sulfonamides has been demonstrated by various authors dating from DeLeon's[1] report in 1937. Coggeshall,[2] in 1938, cured Plasmodium knowlesi malaria in rhesus monkeys with sulfanilamide but found human malaria not affected by this drug.

In 1941 Coggeshall, Maier and Best[3] published their results of the treatment of various types of malaria with sulfadiazine. Thirteen cases of acute naturally acquired malaria were studied of which seven were vivax infections, five falciparum and one malariae. In a case of vivax and in two cases of falciparum infection, no effects were observed. In the remaining 10 cases fever disappeared in from ½ to 3 days and plasmodia disappeared from the blood in from 1 to 5 days. Treatment consisted of 6 grams of sulfadiazine on the first day and 4 grams daily for the next 5 days.

In November, 1941, Swartz and his coworkers[4] published results of their work with sulfathiazole as an anti-malarial drug in nine neurosyphilitics undergoing therapeutic tertian malaria. Chills and fever ceased in every patient after sulfathiazole but the blood was cleared of plasmodia in only five of the nine cases. One of these suffered a relapse 15 days after discontinuation of sulfathiazole therapy. The remaining four patients, whose blood could not be cleared of plasmodia, all experienced clinical relapses in from 12 to 20 days after the chemotherapy was discontinued.

In September, 1943, C. E. Johnson, Jr.[5] found 3 relapses occurring among 12 malaria patients treated with sulfadiazine. In one of these relapses there was no recurrence of symptoms but a reversion of blood smears to positivity occurred nineteen days after completion of the sulfadiazine course. In the other patients there were symptomatic relapses, 33 and 44 days respectively, with reappearance of plasmodia in the blood.

Coggeshall, Martin and Bates[6] were unable to reduce the relapse rates in thirty-three patients with vivax malaria acquired in the Southwest Pacific area by using sulfadiazine over a two weeks period.

The following two case reports illustrate the delay in detecting malaria parasites in patients with obvious clinical malaria, who had recently received sulfadiazine for respiratory complaints.

Case 1, Chart 1.—A 30-year-old white sergeant with three years Army service was admitted to a nearby dispensary on June 11, 1945, with a temperature of 104,° pain over the right loin and chills. Physical examination was negative except for some decrease in resonance and decreased breath sounds over the right lower lobe posteriorly. X-ray of the chest (June 11) showed increased peribronchial markings and cloudiness of the entire right lung and lower left lung, suggestive of atypical pneumonia. A total of 16 grams of sulfadiazine was given during the next three days. On June 13, following a second chill and a temperature rise to 106,° the patient was transferred to a station hospital where a blood sulfadiazine level of 5.8 mgm. per cent was found.

There was no history of previous malaria. The patient saw service in Australia, New Guinea and the Admiralty Islands in 1943 and 1944 during which time he received suppressive atabrine therapy (0.1 gram atabrine daily). The atabrine was stopped at the time of his return to the United States in November 1944.

The patient had two chills following his admission to the hospital. Physical examination was essentially negative except for decreased breath sounds over the right chest posteriorly with fine rales at the left base. Five thick blood smears were negative for malaria. Chest film on June 13 was similar to the one on June 11. Red cells, white cells, and differential white counts were essentially normal. Urinalysis and blood culture were negative. The temperature ranged between 97° and 99.4.° Therapy was symptomatic after June 13. The chest film on June 22 showed clearing of the lung fields with the exception of some fibrous

*Received for publication January 10, 1946.

†Lieutenant-Colonel, Medical Corps, U. S. Army.

‡First Lieutenant, Medical Corps, U. S. Army.

streakings in the lower portion of the right upper lobe, the latter thought to be due to an old inflammatory process. The patient was discharged symptom-free on June 25 with a diagnosis of primary atypical pneumonia.

Two days after discharge, the patient experienced another chill and temperature rise. These repeated themselves every second or third day until the second admission forty-five days later.

The patient was readmitted to the station hospital on August 10 with a chill and temperature of 105.8°. He complained of generalized weakness, aching and headaches. He had lost 30 pounds in the preceding two months. A malaria smear taken on this date was positive for P. vivax. The red blood count was 2.98. "Atabrine" and "feosol" therapy was instituted. There was a temperature rise to 104.6° on August 11, but the temperature was normal after August 12. The red blood count on August 12 was 2,120,000, and hemoglobin 38 per cent.

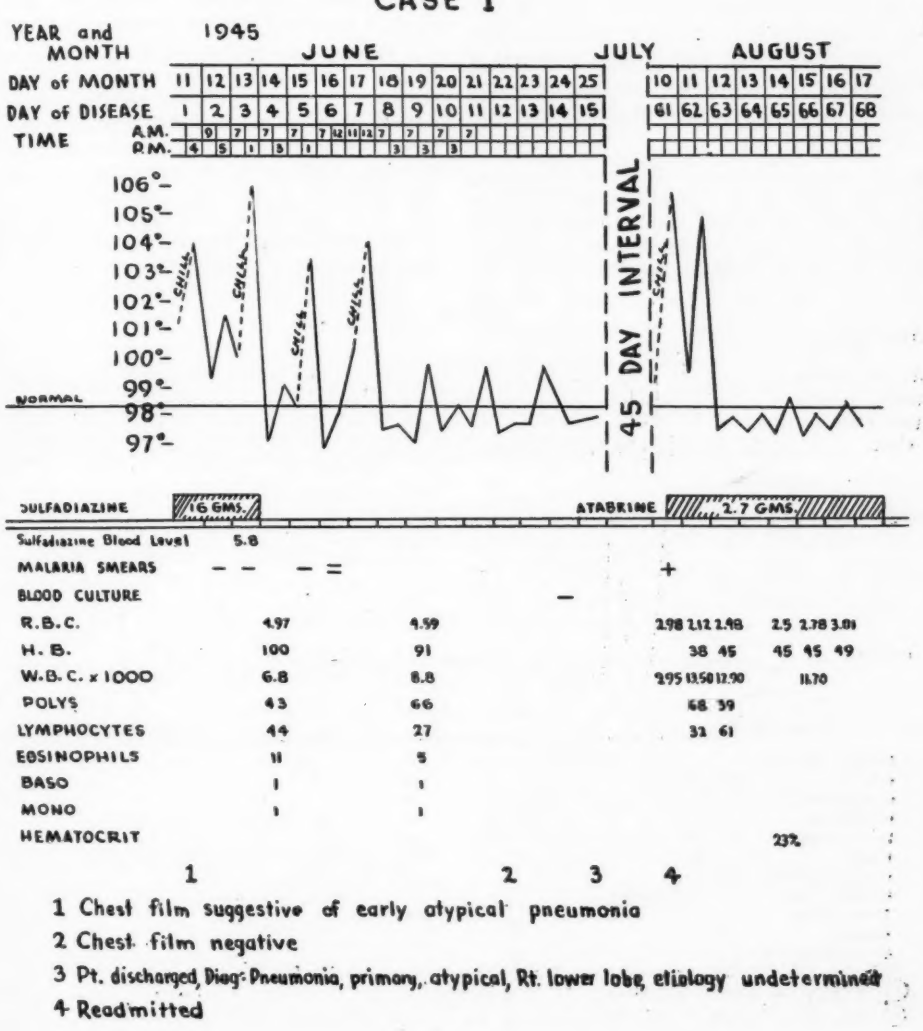


Chart 1

DISCUSSION

This patient had a known sulfadiazine level of 5.8 mg. per cent on the third day at which time two consecutive daily thick blood smears had been found to be negative. During the next two days three additional negative blood smears were made at a time when it could be presumed that there was more than a trace of sulfadiazine in the blood stream. The sulfadiazine effect in reducing the parasitemia level masked further symptoms thus allowing this patient to be discharged from the hospital for a period of forty-five days during which time he lost 30 pounds of weight, suffered recurrent attacks of chills and fever and his red blood count dropped from 4.59 to 2.98.

Case 2, Chart 2.—A 34-year-old colored corporal with three years Army service was admitted on July 4 with the chief complaint of chills, fever and weakness. The present illness began with bilateral chest pain anteriorly on June 27 while he was on furlough. The same evening he developed a moderately severe, nonproductive cough. At 0900 hours (June 28) the patient had a severe chill followed by fever and sweating. The family physician made a diagnosis of pneumonia and started sulfonamide therapy. Chills recurred on July 1 and July 4, prior to admission.

On admission physical examination and chest x-ray were negative. The temperature was 104.8°.

The patient had never had malaria although he had served in New Guinea, Leyte and the Admiralty Islands from March to October, 1944, during which time he had received suppressive atabrine (0.1 gram per day). Suppressive atabrine therapy was stopped upon his return to the United States in November, 1944.

Seven consecutive malaria smears taken from July 4 to July 10 were negative. Blood cultures, Widal test, examination of feces for ova and parasites, and electrocardiogram were all negative. Four grams of sulfadiazine were given on the first day of admission but then discontinued. Chills with temperature rises occurred on July 6 and July 8. The temperature fell to normal on July 9 and remained so until July 27 with the exception of a temperature of 104° on July 23. Therapy during this period was symptomatic.

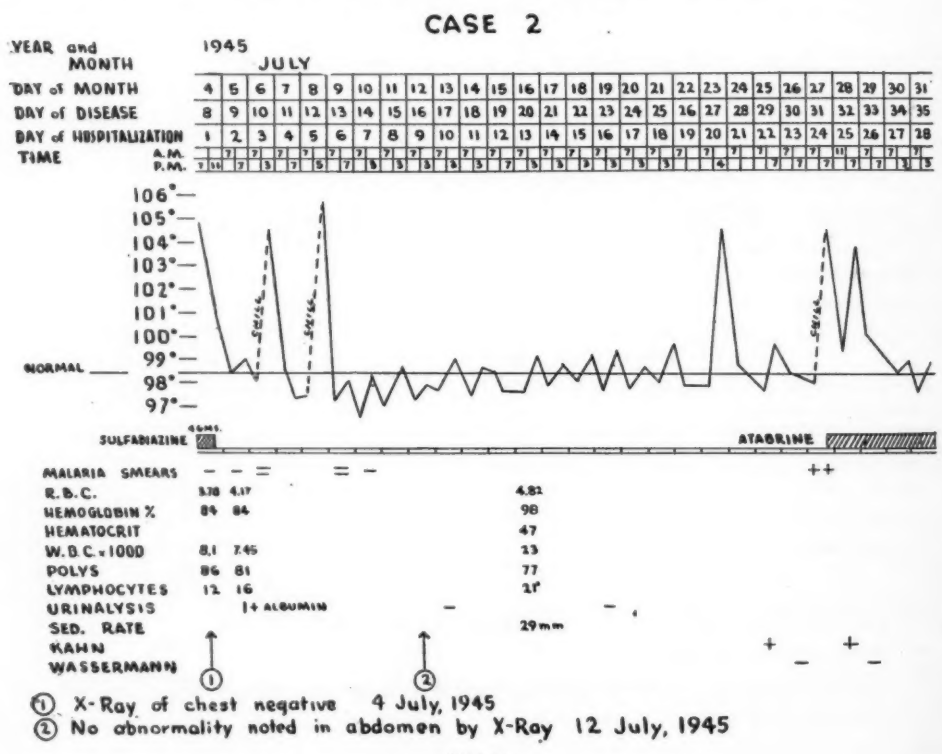


Chart 2

On July 27 the patient had another chill and malaria smears were positive for P. vivax. Atabrine therapy was instituted. The temperature was normal after July 29. The patient was out of bed on August 1 and remained symptom-free until his discharge on August 21.

DISCUSSION

This patient had three chills (June 28, July 1, July 4) before admission to the hospital on July 4 and two more chills followed by hyperpyrexia (104° and 105°) on the third and fifth hospital days. Seven negative blood smears were taken after the institution of sulfadiazine therapy (4 grams total dose).

The inhibitory effect of sulfonamides, particularly sulfadiazine, in human malaria has not been stressed in the American literature, and it is possible that similar instances to the two cases cited may be met with by many medical officers and, in the future, by civilian practitioners. Malaria should be strongly suspected in soldiers returned from service in highly malarious areas, particularly when there is an intermittent fever. Another fact of interest is that in many instances physicians may institute sulfadiazine therapy in patients exhibiting chills, fever and upper respiratory symptoms, thus suppressing the parasitemia level in unrecognized malaria.

(1) Attention is called to two case reports strongly suggesting that the failure to make a proper diagnosis of malaria could be laid to the administration of sulfadiazine.

(2) Sulfadiazine may cause the disappearance of the malaria parasites from the peripheral blood stream and suppress the signs and symptoms of malaria, thus obscuring the correct diagnosis.

BIBLIOGRAPHY

1. DeLeon, A. D.: Treatment of Malaria with Sulfonamide Compounds. Pub. Health Rep., **52**:1460-1463, 1937.
2. Coggeshall, L. T.: Cure of Plasmodium Knowlesi Malaria in Rhesus Monkeys with Sulfanilamide and their Susceptibility to Reinfection. Am. J. Trop. Med., **18**:715-721, 1938.
3. Coggeshall, L. T.; Maier, John; and Best, C. A.: The Effectiveness of Two New Types of Chemotherapeutic Agents in Malaria. J.A.M.A., **117**:13 (Sept. 27) 1941.
4. Swartz, L.; Furst, W.; and Flippin, H. F.: Am. J. Hyg., **34**:141, 1941; Abst., J.A.M.A., **118**:559 (Feb. 14) 1942.
5. Johnson, C. E., Jr.: Status of Sulfonamide Therapy in Malaria. Am. J. Med. Sci., **206**:3:327-36 (Sept.) 1943.
6. Coggeshall, L. T.; Martin, Walter B.; and Bates, Robley D.: Sulfadiazine in Treatment of Relapsing Malarial Infections Due to Plasmodium Vivax. J.A.M.A., **128**:1 (May) 1945.

HYDROGEN ION CONCENTRATION (pH) OF MONILIA ALBICANS INFECTION AND TREATMENT*

By KARL JOHN KARNAKY, M.D.
Houston, Texas

There is a question among the medical profession whether acid or alkaline preparations and douches should be used in Monilia albicans infection.

It is believed by many that alkaline preparations should be used because Sabouraud's media which is used to culture many fungi is highly acid.

EXPERIMENTAL DATA

Sabouraud's medias were made at pH 3.90, 5.65, 6.19, 7.42, 8.11, and 10.82 by adding 0.1 normal sodium hydroxide to the Sabouraud's media and a pure culture of a pathogenic Monilia albicans was inoculated onto these Sabouraud's media at varying hydrogen ion concentrations.

Monilia albicans grew profusely and in the same amount on all media.

ACTUAL CLINICAL pH DETERMINATIONS IN CASES OF MONILIA ALBICANS

To find out further whether Monilia albicans grew in a vagina of normal or an abnormal pH, pH determinations by the electro method were made in 41 cases of definitely proven Monilia albican infection.

Table 1 gives the results.

AVERAGE pH

Anterior fornices	5.35
Posterior fornices	5.68
Left lateral walls	5.42
Right lateral walls	5.47

The average pH of all fornices was pH 5.48. The lowest pH was 4.01; the highest pH was 7.91.

*Read in Section on Obstetrics, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

*From Department of Gynecology, Research Division, Jefferson Davis Hospital, and Baylor Medical School, Houston, Texas. Permission granted by the Research Committee, Jefferson Davis Hospital.

HYDROGEN ION CONCENTRATION (pH) OF VAGINA IN MONILIA ALBICANS INFECTION

No.	Name	Age	Date	Day of Cycle	PF	AF	LLW	RLW	Average pH	Additional Data
1.	A.L.F.	31	9-29-43	14	5.68	5.32	5.65	5.10	5.44	pH over Monilia 5.10 in vagina pH on Monilia on cervix, 5.30
2.	E.A.B.	37	7-2-43	13	5.99	5.11	5.50	5.40	5.50	Monilia
3.	H.E.	34	1-2-45	13	4.99	4.71	4.71	5.13	4.89	Monilia
4.	A.W.F.	25	6-30-44	120	7.38	7.82	6.72	6.63	7.14	Monilia lesion pH 8.11
5.	C.G.	34	5-15-44	6 mos. ago	6.55	6.48	6.62	6.49	6.54	Monilia lesion pH 7.05
6.	D.R.T.	43	5-13-43		5.03	4.58	4.49	5.00	4.75	Monilia of labia
7.	J.E.G.	23	11-23-44	10	6.41	6.41	5.24	5.16	5.81	Ectropion. Ulcer pH 6.83. Cervix pH 6.79
8.	M.M.G.	28	7-14-44	15	5.08	5.19	5.23	5.28	5.20	Anterior lip pH 7.16 posterior lip pH 6.06. Cervix pH 4.76. Ulcer pH 6.0[a]
9.	H.H.J.	25	4-7-44		4.41	4.30	4.17	4.06	4.24	Monilia
10.	E.T.M.	23	2-21-43		4.71	4.71	4.67	4.62	4.68	Ectropion pH 6.87
11.	F.J.M.	55	5-29-44		5.97	5.63	6.11	5.58	5.83	No menses in 9 years
12.	D.R.T.	31	12-18-44	54	6.38	5.49	5.34	5.57	5.70	Monilia
13.	S.L.	21	4-25-44	6	3.93	4.08	4.32	4.02	4.09	Monilia
14.	A.F.	39	4-29-44		4.55	4.69	4.43	4.43	4.53	Monilia
15.	L.S.	49	5-24-44	5 mos. ago	6.27	5.73	6.13	5.95	6.02	Had complete hysterectomy
16.	R.M.T.	25	1-2-45	3 yrs. ago	7.11	6.54	5.89	5.93	6.62	White flakes, ph 5.51
17.	J.N.T.	25	7-25-44	4 mos. ago	5.81	6.06	5.59	5.76	5.78	Four months pregnant
18.	D.R.T.	43	2-14-44	12	4.48	5.07	5.07	4.69	4.83	Red area on left fornix, 4.82
19.	C.G.W.	35	6-23-44	20	4.21	4.01	4.67	4.56	4.36	White secretion in vagina
20.	C.E.W.	19	11-11-44	16	5.21	5.19	5.38	5.72	5.38	Ectropion pH 7.18
21.	R.S.	37	5-26-44	26	5.31	5.07	5.82	6.11	5.57	Cervix pH 6.66. Ulcer pH 7.30. Trichophyton
22.	E.T.	24	3-20-44	5	5.51	5.55	5.81	5.39	5.57	Cervix pH 6.72
23.	G.S.	39	9-8-44	20	5.23	5.11	5.39	5.15	5.22	
24.	O.S.	23	1-6-44		5.62	4.46	5.05	5.03	5.04	Six months pregnant
25.	C.W.K.	35	9-7-45	6	4.59	4.55	4.22	4.52	4.47	Monilia
26.	F.H.	54	7-12-45	20	6.81	5.40	5.11	5.45	5.69	Cervix pH 6.97
27.	J.F.C.	31	9-4-45	13	5.22	5.62	5.33	5.41	5.39	
28.	A.L.B.	32	8-25-45	8	5.51	5.68	5.72	5.41	5.58	Itching, one year
29.	R.S.L.	32	8-10-45	11	4.78	4.51	4.71	4.76	4.69	Cervix pH 4.81
30.	I.M.B.	27	7-5-45	11	5.98	4.93	6.01	5.68	5.65	Monilia of labia and vagina
31.	C.O.	39	7-24-45	12	5.08	5.61	5.91	5.92	5.63	Monilia growth 6.67
32.	F.H.K.	38	8-31-45	25	6.45	5.29	5.68	5.52	5.73	White flakes pH 6.05
33.	M.E.S.	30	9-12-45	60	6.01	6.21	6.26	6.68	6.29	Cervix 6.73
34.	B.I.T.	37	8-16-45	3 yrs. ago	7.06	6.89	6.91	7.57	7.11	Hysterectomy three years ago
35.	A.G.S.	34	9-6-45	22	6.31	6.32	6.61	7.11	6.59	Ulcer pH 6.72
36.	A.V.H.	18	9-3-45	8 mos. ago	4.08	4.71	5.13	5.71	4.91	Ulcer of cervix 5.38 pH
37.	A.L.L.	32	9-14-45	35	6.42	6.45	6.18	6.24	6.32	Cervix pH 6.41
38.	J.B.	26	9-18-45	15	4.99	4.90	4.89	4.82	4.86	Monilia growth on cervix pH 5.45
39.	L.M.P.	29	9-21-45	41	5.11	5.01	5.02	4.97	4.03	Monilia cervix 5.51
40.	L.L.W.	34	10-2-45	22	5.02	4.31	4.31	4.51	4.80	Monilia
41.	H.P.	38	10-2-45	2	7.91	6.82	6.46	7.47	7.16	Monilia vaginitis
					5.68	5.35	5.42	5.47	5.48	

Abbreviations: AF: Anterior Fornix PF: Posterior Fornix LLW: Left Lateral Wall RLW: Right Lateral Wall

Table 1

DISCUSSION

In a previous study of 52 consecutive normal vaginas the pH as compared to the Monilia albicans group was as follows:

Areas in Vagina	Normal Vagina	Monilia
Anterior fornix	4.10	5.35
Posterior fornix	4.14	5.68
Left lateral walls	4.12	5.42
Right lateral walls	4.12	5.47
Average pH	4.12	5.48
Lowest pH	3.22	4.01
Highest pH	4.99	7.91

The pH of the normal vagina was found to be below 5.0.

In the treatment of Monilia albicans with 5 per cent gentian violet in 15 per cent ethyl alcohol the following pH values were obtained:

	Before	After Gentian Violet
Anterior fornix	5.07	5.47
Posterior fornix	4.48	5.56
Right lateral wall	5.07	5.13
Left lateral wall	4.69	4.56

From the above table one can see that the pH is not markedly altered.

"Floraquin" which contains an organic iodide keeps the vaginal pH near 4.0 to 4.5.

Vinegar, 5 tablespoonfuls to two quarts of warm water keeps the vaginal pH near 4.0 to 4.5.

Sodium bicarbonate, 3 tablespoonfuls to two quarts of warm water keeps the vaginal pH near 6.9 to 8.1.

Low pH values, 3.5 to 5.0, destroy or inhibit the growth of most pathogenic vaginal micro-organisms, while pH 5.5 to 8.1 favors growth of most of these organisms.

Monilia albicans grows at any pH and if alkaline douches are used one does not destroy either Monilia albicans or other micro-organisms. On the other hand if low acid pH douches (vinegar) are used the associated pathogenic micro-organisms are destroyed.

CONCLUSIONS

It might be concluded that Monilia albicans grows at any pH on Sabouraud's media and in the vagina. Monilia albicans was found more often in vaginas of abnormal pH.

Alkaline douches are not advocated because Monilia albicans as well as associated micro-organisms grow at the resulting pH produced by alkaline (soda bicarbonate) douches.

Acid (vinegar) douches are advocated because they inhibit or destroy the associated micro-organisms.

From this study one might conclude that there is no rationale to the use of alkaline over acid douches for Monilia albicans.

REFERENCES

1. Plass; Heseltine; and Borts: Am. Jour. Obst. & Gynec., **21**:320, 1931.
2. Karnaky, K. J.; Trichomonas Vaginalis and Monilia Albicans as Causes of Leukorrhea. Sou. Med. Jour., **28**:796, 1935.
3. Karnaky, K. J.: Normal Physiological Douches. Sou. Med. Jour., **30**:69, 1937. Am. J. Surg., **64**:107, 1945.

326 Medical Arts Building

DISCUSSION (*Abstract*)

Dr. James R. Bloss, Huntington, W. Va.—I want to ask Dr. Hudgins, whether he or Dr. Karnaky ever tried putting the patient in the knee-chest position, filling the vagina full of boric acid, and plugging it up for twenty-four hours.

My observation is that this procedure will cure those cases.

Dr. Frank Lock, Winston-Salem, N. C.—At the Bowman Gray School of Medicine we have been very much interested in vaginal infections, and I have become particularly interested in infections with Monilia albicans. I am surprised at the results obtained by Dr. Karnaky in pH determinations associated with this type of infection. We use nitrazine yellow for pH determinations. This method is reasonably accurate, and we have found a consistent pH of 4.0 to 4.5 in the presence of candida vaginitis and vulvitis.

The majority of the patients we see are referred to us after gentian violet and other antiseptic agents have

failed to relieve them of symptoms. Most of them are complaining of pruritis vulvae. We have found that the classical local changes of bluish discoloration of the mucous membrane and skin, seropurulent discharge, and whitish plaques of organism on the vaginal mucosa are the exception rather than the rule. Many patients have no apparent local lesion; however, a diagnosis is readily made if vaginal and vulvar cultures are taken. We are not satisfied to identify the Monilia albicans organism on a basis of smears or ordinary culture technics. Stelatoidea and other non-pathogenic organisms which are commonly present in the cultures from the vulva are indistinguishable from candida by ordinary culture technics. We insist upon identification of the organism grown on cornmeal agar, and the majority of the organisms thus grown are injected into a rabbit to prove their pathogenicity.

Our experience with gentian violet has been disappointing. In the acute case of moniliasis, and in the patient who has not been previously treated, it is usually successful. There is little question, however, that some strains of Monilia albicans are not susceptible to gentian violet, and that patients infected with these strains do not improve after its use. In addition, there are a fair number of patients who are sensitive to gentian violet, and its use in them simply aggravates the condition. A third objection to gentian violet is the discoloration of clothing and of the patient's person.

Our greatest success has been with the use of a preparation composed primarily of a solution of sodium perborate as a local cleansing agent and as a douche. With this preparation, we have been able to obtain negative cultures and a prompt relief of symptoms in every case in a consecutive series of 59 patients. Two of the patients have had recurrences, but all have been completely relieved of symptoms almost at once. This preparation has the advantage of being colorless, clean, and pleasant for the patient's use.

Dr. John D. Weaver, Galveston, Tex.—We have had trouble keeping Monilia from growing, instead of finding it in our cultures.

We give the patient 2 per cent aqueous solution of gentian violet to pour on a menstrual plug for insertion into the vagina, and the patient does the treatment herself at home. Many of our patients live a hundred, or possibly eight hundred to a thousand miles from us in Galveston, and we cannot see them every other day, so we use this method. We have had some excellent results. The patient is instructed to pour gentian violet on the end of the plug, not too far absorbed, and to leave it in place all day. It is renewed each day and each night. They complain of the mussiness, but there is less complaint when they put it in themselves.

Dr. A. P. Hudgins, Charleston, W. Va.—Discharges during pregnancy are very frequently found to be of this origin. When they do not clear up with other methods of treatment, this pathological organism should be considered.

THE MANAGEMENT OF DIABETES MELLITUS DURING PREGNANCY*

By H. T. ENGELHARDT, M.D.
and
J. P. MELVIN, JR., M.D.
Houston, Texas

INTRODUCTION

Since the introduction of insulin in the treatment of diabetes mellitus in the pregnant woman, the mortality rate for the mother has greatly decreased but the same cannot be said for the fetus. Williams[1] in 1909 reported a maternal mortality of 27 per cent, considered at that time to be an extremely low figure. Twenty-six years later, after insulin had been introduced, Joslin[2] was able to report a maternal mortality of 5 per cent. Since then, the maternal mortality rate has decreased even more, approaching that of the non-diabetic maternal mortality. This marked decrease is due to several factors, namely: better understanding of the physiology of the diabetic and especially of the pregnant diabetic; closer cooperation between obstetrician and internist; and of course, the introduction of, and skill in using, the insulin preparations. Fertility which has increased in the diabetic woman cannot be compared with the marked decrease in maternal mortality, and pregnancy is still by no means a common event.

In contrast to the decrease in maternal mortality following introduction of insulin, the fetal mortality has remained consistently high. Williams[1] reports a fetal mortality of 41 per cent prior to 1920 and Skinner,[3] reporting in 1933, gave the figure at that time as 45 per cent. Barns[4] in 1941 reported a fetal mortality of 44 per cent. However, White and Hunt[5] have recently reported (1940) on a small series of pregnancies in diabetic women with a fetal mortality of 7 per cent.

MATERIAL

The total number of diabetic patients in this study represented 0.9 per cent of the total ad-

*Received for publication April 3, 1946.

*From the Department of Medicine, Tulane University School of Medicine, and the Charity Hospital of Louisiana, New Orleans, Louisiana.

missions to the Charity Hospital at New Orleans, Louisiana, from June, 1940, through June, 1944. Of these 2,405 diabetics who sought treatment, 1,490, or approximately 60 per cent were females. Of these 1,490 diabetic women admitted, only 23, or 1.6 per cent were referred to the obstetrical service with a diagnosis of pregnancy. The average age of the mothers in this series was 32.5 years.

COMPLICATIONS OBSERVED

Two patients were admitted to the hospital in diabetic coma and one of these expired prior to delivery; the other patient delivered a full term stillborn after recovery from the comatose state. Three other patients were admitted in severe acidosis. Of these three, two delivered prematurely, one a polyhydramnios, the other a well formed stillborn. The third patient was treated successfully and had an uneventful full term delivery of a normal child.

There were two cases of polyhydramnios including the afore-mentioned case, or 8.7 per cent. This contrasts with the 24 per cent incidence of polyhydramnios reported by Barns.[4] In the remaining 21 pregnancies, there were five stillbirths, three abortions and one premature living child of 5½ months which is essentially the same as that reported above by Barns,[4] Skinner[3] and Williams.[1] White and Hunt[5] have conducted hormone assays in 125 consecutive pregnant diabetics after the twenty-fourth week of pregnancy and these assays consisted in determining chronic gonadotropin levels and pregnanediol excretions. Of this number, 77 showed abnormal levels and 27 of these were treated by replacement therapy, using stilbestrol and progesterone. This regimen achieved a fetal mortality rate of only 5 per cent. They feel that the fetal mortality is directly related to an imbalance of chronic gonadotropin and pregnanediol in pregnancy and replacement therapy appears to be followed by a much improved outlook. Toxemia of pregnancy also seems to be modified in their series. Our maternal mortality was confined to the one patient who was admitted in diabetic coma and did not recover, a mortality of 4.3 per cent. In Skinner's series,[3] an immediate mortality of 9.3 per cent was given which differs from ours considerably. This is unquestionably due to the fact that most series of this type are necessarily small and subject to great variation regarding individual incidences. It is a point worth noting that all of our patients were delivered per vaginam.

TREATMENT

Because of the difficulty in following the pregnant diabetic prepartally, we could not determine accurately the exact changes in insulin requirements by trimester. Ten of our total showed no change in insulin requirements, eleven showed an increase, one an actual decrease in insulin requirements and on one there was insufficient data.

The physiologic changes in carbohydrate tolerance during pregnancy may conveniently and accurately be divided into those observed during the first, second and third trimesters.

First Trimester.—One of the most common and disturbing findings is a lowering of the renal threshold. This is of little moment providing the glycosuria does not reach such proportions as to eventuate in acidosis. Herrick and Tillman[6] report a decrease in carbohydrate tolerance during the first trimester. Insulin requirements quite naturally increase during this period.

Second Trimester.—The weight of opinion seems to be that there is very little change in either carbohydrate tolerance or insulin requirements during this period. Mosenthal[7] says that there may be a decrease in carbohydrate tolerance in some cases. Allen[8] and Hurwitz and Irving[9] claim a gradual and progressive decrease in the mother's carbohydrate tolerance during the entire pregnancy, however.

Third Trimester.—The observations of Allen[8] quoted above are at variance with the widely held hypothesis that there is a decrease in insulin requirements during the third trimester, due to the effect of insulin liberated by the fetal pancreas.[2] Herrick and Tillman,[6] in a series of twenty patients, found that nine had a definite improvement in carbohydrate tolerance, seven showed a decreased tolerance, and four remained unchanged. Because of the fact that sudden changes in carbohydrate tolerance can and do take place during this trimester, the physician is not justified in dogmatically following any fixed ideas, but should watch his patients closely.

One of the most important points to be gathered from a comprehensive review of the methods of treatment is that they vary only in more unimportant aspects. In addition, the essentials of treatment, common to all methods, resemble each other closely in their simplicity and are arrived at by the same reasoning. In the discussion to follow we assume that each diabetic woman, prior to pregnancy, has been regulated in an acceptable fashion.

Total caloric content of the diet will vary as pregnancy progresses but a safe rule is that every woman in the first trimester should have approximately 30 calories per kg. of body weight. As pregnancy progresses, and the demands of the fetus on the mother increase, the diet should be increased accordingly. Dieckmann and Brown[10] indicate that the average weight gain in pregnancy is approximately 21 pounds with slight variations. Weight gain should be restricted in a patient of adequate weight at conception to 16 pounds. This may entail salt restriction in some cases. There is little change in weight in the first trimester; however, in the second trimester, the pregnant woman gains approximately a half a pound a week, which increases to approximately two pounds per week in the third trimester. These observations on non-diabetic women apply equally to diabetics. We believe that the pregnant diabetic should be kept on her original diet during the first trimester. This is gradually increased as pregnancy progresses, the increase being mainly in the protein fraction. Bethell et alii[11] have suggested that inadequate protein intake in pregnancy is the cause of the mild and frequently severe macrocytic anemias that are occasionally found in the pregnant woman. Musser and Sodeman[12] have pointed out that in comparison with the average requirements of approximately one gm. of protein per kg. of body weight for the non-pregnant woman, the pregnant woman will need 1.5-2 gm. per kg. of body weight beginning at about the fifth month. They stress the importance of a high protein intake during the period of lactation. Fat intake is not increased in pregnant diabetics, the caloric requirements being fulfilled by the above mentioned increases in carbohydrate and protein. Vitamin and mineral requirements should be maintained as in any pregnancy.

It is our practice to leave the patient on the same dose of protamine zinc insulin (PZI) during pregnancy which she took prior to conception. We control excess glycosuria by the use of regular or crystalline insulin given on the sliding scale. For example, the patient may be taking 30 U. PZI and spilling urine which reduces Benedict's qualitative solution to green before breakfast, red before lunch and yellow before dinner. In this case one would give no insulin for green, 10 units for yellow and 15 units for red. We feel that in this manner we can more properly control the changes in carbohydrate tolerance which occur quickly in pregnancy and at the same time, the amount of PZI is not enough to cause insulin reaction in the majority of cases.

All of our patients were delivered per vaginam and we feel that the advocates of caesarean section with caudal anesthesia as a routine procedure are unnecessarily radical. In the absence of toxemia and pelvic abnormalities, it would seem that caesarean section has little to offer the patient and carries with it the dangers consequent to any major surgical procedure.

SUMMARY

The results of twenty-three diabetic pregnancies are reviewed. These data were obtained from the study of 1,490 diabetic women seen in the Diabetic Clinic of Charity Hospital from 1940 through 1944. The known average duration of diabetes in this group was 3.6 years and the average age was 32.5 years. The maternal mortality of this series was 4.3 per cent and the fetal mortality 47 per cent. The disturbed physiology and its clinical applications together with the complications and treatment are discussed.

BIBLIOGRAPHY

1. Williams, J. W.: Clinical Significance of Glycosuria in Pregnant Women. Am. J. Med. Sci., **1**:137, 1909.
2. Joslin, Elliot P.: The Treatment of Diabetes Mellitus; Seventh Edition, Lea & Febiger, Philadelphia, Pa., 1940.
3. Skinner, E.: Diabetes Mellitus and Pregnancy. Quart. J. Med., **2**:353, 1933.
4. Barns, H. H. F.: Diabetes Mellitus and Pregnancy. J. Obst. and Gyn. of British Empire, **48**:707, 1941.
5. White, P.; and Hunt, H.: Pregnancy Complicating Diabetes. J. Clin. Endocrinology, **3**:500, 1943.
6. Herrick, W. W.; and Tillman, A. J. B.: Diabetes and Pregnancy. Surg. Gynec. of Obst., **66**:37-43 (Jan.) 1938.
7. Mosenthal, H. O.: Diabetes in Pregnancy; Bulletin of the New York Academy of Med., **18**:217, 1942.

8. Allen, E.: Glycosuria of Pregnancy. Am. J. Obst. and Gynec., **38**:982, 1939.
9. Hurwitz, D.; and Irving, F. C.: Diabetes and Pregnancy. Am. J. M. Sci., **194**:85-92 (July) 1937.
10. Dieckmann, W. J.; and Brown, D.: The Obstetric Management of Patients with Toxemias. Am. J. Obst. and Gynec., **38**:214, 1939.
11. Bethell, F. H.; Gardner, S. H.; and MacKinnon, F.: Influence of Iron and Diet Upon the Blood in Pregnancy. Ann. Int. Med., **13**:91, 1939.
12. Musser, J. H.; and Sodeman, W. A.: Vitamins and Mineral Requirements in Pregnancy. J. Michigan State Med. Sci., **40**:292, 1941.

PHYSICAL THERAPY IN A GENERAL PRACTICE*

By G. J. P. Barger, M.D.†
Washington, D. C.

"Lowered vital resistance" is an important concept in physical therapy. I like to think of it in terms of health levels.

It must be obvious that people are living at different health levels. A simple graph will help visualize this:

100 per cent health level
80 per cent health level
60 per cent health level
40 per cent health level
20 per cent health level
Zero and out

Your health level determines the degree of resistance to bacterial or virus invasion, the degree of protection against the stresses of life, the range of your recovery ability, and therefore of the degree in which you can enjoy life and profit by it, and of the cost of medical service to yourself.

Your health level is determined in early life, by things beyond your control: heredity, character of birth process, quality of care through infancy and childhood; and in later life, by things within your control: your ideals, your application of health knowledge, your self-discipline.

With most people, a health level chart would show many slow changes down and up again, many sudden changes down and up again, with a tendency downward as one grows older.

Your health level drops gradually lower and lower as a result of the cumulative effects of small doses of neglect, of indulgence, and of dissipation.

Your health level may drop suddenly to dangerously low levels, favoring bacterial or virus invasions, and serious illness, as a result of excessive fatigue, of severe chilling, of considerable loss of sleep, or from great emotional stresses.

There are seven types of active physical measures commonly used by me:

(I) Heat applications, general and local.
(II) Mechanical stimulation of the circulation.
(III) Ultraviolet light.
(IV) Colon irrigations.
(V) Manipulative treatments.
(VI) Ion transfer by direct current.
(VII) Minor electrosurgery.

Various combinations of these modalities are helpful in a surprisingly large list of physical ailments, in many cases as the essential treatment, in others as supportive treatment.

(I) HEAT APPLICATIONS

One of the best statements on the principle of the use of heat is found in Bayliss' General Physiology,[1] as follows:

"Chemical force is a function of the free energy: very little is definitely known as to chemical resistance, except that it is greatly diminished by rise of temperature.

"All chemical reactions are, therefore, increased in rate by rise of temperature. From the standpoint of the kinetic theory of heat, it is easy to see why all processes conditioned by rate of molecular movement are accelerated by rise of temperature. A rise of 10° C. usually doubles or trebles this rate (van't Hoff law). We know that rise of temperature accelerates the chemical changes in the heart muscle, and, in fact, it is very interesting to find that this increased metabolism is directly proportional to the increase of rate. Apart from its effect on chemical reactions a high temperature is also of advantage in the action on physical processes, diminishing the internal friction of liquids such as blood, hastening diffusion, and so on."

This general principle about the influence of heat on chemical changes, will be more significant if considered in connection with (1) the functions of the blood; nutrition, excretion, repair, defense; (2) the multitude of functions of the liver: heat production, metabolism of all food classes, detoxification, regulation of blood volume, and many others; and (3) the coor-

*Read in Section on Physical Medicine, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

†Director of Physical Therapy, Georgetown University Hospital and Medical School.

dinating functions of the autonomic nervous mechanism.

For when it is possible by effective heating of large blood reservoirs, as in the heart, lungs, liver, and abdominal area, to diminish the internal friction of the circulating blood, hasten diffusion, and increase the rate of chemical reactions taking place in tissue metabolism (7 per cent for each degree elevation) and all controlled by a coordinating nervous mechanism, which itself is favorably influenced by heat, we can see what a potent aid we have in effective general or local heating, in favorably influencing physiological processes.

Limitations.—The extent to which the biological mechanisms of the body may be stimulated, however, depends upon the previous condition of the body. Deficiencies in essential fuel elements, or of hormone glands because of operation, or of certain elements because of heredity, must be provided through the usual channels of balanced diet, and of hormone or chemical therapy.

Minor Artificial Fever.—To attain the maximum value of heat the whole body should be heated.

Short sessions of artificial fever, or minor artificial fever, one-half to one-hour sessions, attaining temperatures of 101 to 103°, have a sufficiently wide field of usefulness to justify more attention than they are currently receiving.

Minor artificial fever is useful in most upper respiratory infections in adults, children, or babies, and there is a tremendous need for more effective treatment of colds or sinus infections in babies and young children, not to mention adults.

Minor artificial fever is useful in many conditions of multiple trauma, in treatment of stiff joints after casts, in giving relief to arthritics, in acute infectious diseases of children, reducing the chances of serious complications.

Minor artificial fever, two or three times weekly, is useful in relieving the nervous tensions that arise in many workers working under high pressure.

Minor artificial fever is helpful in relieving symptoms growing out of imbalance in the vegetative nervous mechanism, for heat favorably influences the functioning of this regulative nervous mechanism.

Minor artificial fever is one of the best and most easily available means of quickly restoring the body to a high health level after one of the sudden drops that result from severe fatigue, severe chilling, marked loss of sleep, or emotional stresses.

The hot tub bath is probably the most widely and easily available means for giving such minor artificial fever, but the same results may be attained in horizontal electric light cabinets, in the steam or hot water spray fever cabinets, in the induction short wave cabinets, or with the fever bag, or in the larger whirlpool baths or the Hubbard-Currence tanks, devices which can be prepared for operation within a few minutes.

Diathermy.—The superior results of such general body heating over local heating, even for a single joint, can be approached with the aid of shortwave diathermy and partial insulation, by applying the diathermy electrodes over the spine, or over any of the large blood reservoirs in the trunk, and additional diathermy applications over the joint or other part involved.

Such diathermy applications have value in many pathological conditions, and can often be constructively used even before a complete diagnosis is made, thus satisfying the often urgent pressure of relatives to do something quickly.

The various makes of short wave diathermy machines on the market today are the most efficient and versatile devices available for putting heat where you want it, in the quantity you want, and quickly.

But adequate dosage of shortwave diathermy is important. Many unsatisfactory results are due to inadequate dosage.

For applications of local heat to head, neck, or any part of the trunk, short wave diathermy is probably superior to most other methods of heating; but for the extremities, other modalities may be equally efficient, as the hot water bath, with or without whirlpool device, the paraffin bath, steam jets, infra-red ray lamps or hot fomentations.

Since with most adequate heat treatments there is considerable perspiration and consequent salt loss, a salt water drink, 5 to 10 grams

in a weak solution, is commonly given with the treatment.

A fair number of conditions referred for physical therapy, variously diagnosed as bursitis, neuritis, myalgia, myositis, fibrositis, low back pain, or muscle cramps of feet or legs, disappear like magic under adequate doses of salt, whereas physical measures are of little value when salt deficiency is the real cause of the discomfort.[24]

(II) MECHANICAL STIMULATION OF THE CIRCULATION OF BOTH BLOOD AND LYMPH, TO PROMOTE ACTIVE METABOLIC EXCHANGES AND FOR DECONGESTIVE EFFECTS

Because "stasis anywhere in human physiology, as a rule, is thought to play an important role in the development or exacerbation of pathology,"[2] a number of physical measures aim to assure an active circulation, not alone through the minute blood vessels of the involved area, but also through the lymphatics.

The problem of a severely traumatized tissue is well presented by Dr. Clay Ray Murray,[3] in charge of the Fracture Service of Presbyterian Medical Center, New York City, who says:

"There are torn and thrombosed vascular and lymphatic channels, lacerated tissues infiltrated by hemorrhage, inflammatory exudate with its cellular constituents, and the transudate of edema from circulatory and lymphatic obstruction.

"In a matter of hours and days, not of weeks and months, such infiltrate is organized into scar tissue in muscles and soft parts, about vessels and nerves, in joint capsules and about tendons.

"It is therefore important that early active measures be applied while the exudate and infiltration can still be dispersed, in order to assure the maximum return toward normal function.

"There is only one mechanism through which these measures may be applied, the circulation."

The physical measures for the activation of blood and lymphatic circulation for such conditions utilize gravity, muscle pumping, massage and heat.

The problem of a slowed circulation in hospitalized patients is presented by Dr. William Dock[4] of Cornell University Medical College in one of a recent series of papers on bed rest.

"Absolute bed rest kills more patients than anesthesia and all the drugs in the pharmacopeia added together. Bed rest robs the bones of chalk, as it causes an immediate, severe, negative calcium balance. It greatly weakens vasomotor tone and wastes the voluntary muscles. It causes hyperemia, edema, and collapse of the dorsal parts of the lungs. It predisposes to ulcers of the skin, and to hypostatic pneumonia. In elderly men it often precipitates severe symptoms of prostatism, and it is a notorious background for many cases of cathartic habituation."

Another serious aspect of bed rest is the development of thrombi in the veins of the calf, in one paper reported as 30 per cent of all hosital patients ages 17 to 90; in adults who have been in bed 2 weeks or longer, the incidence reaches 60 per cent, while nearly all show necroses and inflammatory reaction in the calf muscles, which apparently initiate the process.

The incidence of thrombi goes up with age, doubling after 40, and again after 60.

Pulmonary emboli from thrombi in legs or pelvis are reported in from 5 to 13 per cent of autopsies, whereas pulmonary embolism is very rare in ambulatory patients, or even in those who lead wheel chair lives. Aside from the pulmonary embolism which at times results, thrombophlebitis is capable of producing lifetime disability through the often resulting permanent edema and recurring ulcerations.

Among the precipitating factors of thrombophlebitis are listed circulatory retardation due to bed posture, immobility, and shallow breathing.

Children are much less susceptible than adults to these disabilities arising from hospitalization and complete bed rest.

Recognition of this problem is sufficiently wide to have resulted in recent rather marked changes in the care of the sick and injured: their hospital stay is shortened; they are allowed up in chairs sooner; they are encouraged to walk around the hospital more; new methods are introduced to limit the extent of immobilization; and for those who must be wholly or partially immobilized, programs are developed for systematic exercises of the extremities, or of parts not immobilized, of muscle tensing inside casts, of frequent changes of position, and of deep breathing.

And in the new rehabilitation program for the care of the war injured, individual corrective exercises, group calisthenics and games, occupational retraining, everything to encourage increased activity.

Some Physiological Considerations in the Matter of Activating Blood and Lymph Circulation.—Blood normally makes a complete circuit of the body three times per minute. The circulation times are markedly faster during muscular exercises. During rest the flow along the lymph vessels of the muscles and subcutaneous tissues is slight. During activity the contracting muscles exert a pumping effect upon the lymph driving it along the vessels. Blood is five times more viscous than water. In muscular exercises and in fever the blood temperature is raised, the viscosity of the blood is lowered, and the work which the heart is called upon to do in overcoming the frictional resistance in the smaller vessels is thereby appreciably reduced.

Dr. Hans Kraus[5] of the Vanderbilt Clinic, in New York City, says:

"Active motion should be used for every injured section of the locomotor system as soon as it can be employed without jeopardizing normal anatomy and without pain. The healing processes in other tissues than muscles are furthered through proper muscle rehabilitation, but always with the muscles as the means. It is the patient's muscles which can break up minor adhesions, and initiate adequate circulation, which, last but not least, is itself responsible for range of motion in the afflicted joint."

Common physical methods available for speeding up the circulation through the smaller blood vessels and the lymphatics, are: (1) Muscle pumping, (a) by active exercises, the most important of all, and (b) by electric massage, the nearest substitute; (2) massage—hand massage, hydromassage, vacuum cups, suction and pressure; (3) gravity—use of elevation, continuous and oscillating, with or without intermittent venous occlusion; and (4) heat.

Of these four items, I am limiting my comments to one that has been somewhat neglected: (1) Muscle pumping, (b) by electric massage. This is an easily applied technic which deserves more extensive use. It produces practically all the physiological effects of hand massage, often does it better from the standpoint of the patient, more easily from the standpoint of the operator, without the trauma of massage, for longer and more effective periods than hand massage can usually be given, and more cheaply in hospital practice.

I am particularly interested in electric stimulation of muscle groups, which I term electric massage. It is the nearest substitute to active exercise of any of the means for stimulating circulation. It is the oldest form of electrotherapy, being originally performed entirely by the static machine, which is still probably the most efficient way artificially to produce muscle pumping, or promote decongestion of traumatized areas. But the smaller devices variously called the Morse wave machine, sine wave machine, polysine, chronowave, or Bristow coil, are cheaper, portable, and more widely available than are the static machines, and one technician can supervise the operation of several of them for some purposes.

A recent paper by Thomas, Lazere, and Hines[6] from the Department of Physiology of the University of Iowa, reported experimental work on animals:

"Electric stimulation of paralyzed muscle, if of sufficient intensity to induce strong contractions, delayed atrophy and enhanced recovery from paralysis."

"A state of marked fatigue brought about through artificial stimulation did not appear to impede the extent or velocity of neuromuscular regeneration."

"Immobilization of the paralyzed muscles by casts definitely delayed the progress of recovery following reinnervation."

In electric massage, the muscle is stimulated to contract through its motor end plates without trauma to the delicate capillaries and lymphatics. The stimulus may be applied to a single motor end plate by a small electrode to a group of motor end plates by a large electrode, or to a nerve trunk, contracting most of the muscles supplied through that trunk, even with the part in a cast. Thus it is possible to have rhythmic pumping effects on the muscles and thereby increase the rate of flow through capillaries and lymphatics.

Over areas too painful to massage by hand, over traumatized areas too painful to move voluntarily, it is possible to use electric massage with scarcely any pain, and for periods long enough, and vigorously enough to be effective in giving relief of pain and to promote decongestion and healing. Electric massage can often be profitably combined with heat treatments, saving considerable time in treatment, and enhancing the value of both. It may be so combined with infra-red heat, with water bath

treatments, in steam, water spray or hot air fever cabinets. It is an excellent alternate to pavaex in peripheral vascular disease.

Mennell,[7] in his textbook on Physical Treatments, in the chapter on "The Use and Abuse of the Faradic Current," lists some twelve different uses to which various forms of electric massage may be put, and emphasizes the value of this technic.

Electric massage, usually preceded or accompanied by heat treatments, is used by me in all joint sprains, in bursitis, fibrositis, myositis, neuralgias, about most arthritic joints, in toxic spastic muscles and stiff necks, in facial paralysis, in relief of distension in acute indigestion, in peripheral vascular conditions.

(III) ULTRAVIOLET LIGHT

Ultraviolet light, natural and artificial, has found substantial applications in the field of physical medicine, in the fields of diagnosis, of prophylaxis, and of treatment.

My personal use of ultraviolet light consists in the use of a large cold quartz grid after treatments by heat and massage as a general tonic and to increase skin resistance to cold or chilling; the use of both large and small cold quartz grids or rods for fungus infections of any part of the body, and after electrodesiccation or electrocoagulation treatments, for any infection on the body surface which might be due to bacteria or fungus, including erysipelas, for open wounds or burns, for irradiating vaseline for dressings for burns or wounds, and last, but not least, ultraviolet blood irradiation.

Because ultraviolet blood irradiation is probably new to many of you, I shall limit my remarks to this field.

The early work in ultraviolet blood irradiation by Knott showed that the red blood cells are relatively insensitive to ultraviolet rays and can stand a long exposure without damage, as compared to the white cells, which have a relatively narrow range of exposure between what is useless and what is harmful to them.

In the Knott technic of ultraviolet blood irradiation, therefore, the time factor is limited to this narrow range of time in which the effects of ultraviolet are stimulating to the leukocytes. The effect of this proper irradiation on the leukocytes is to stimulate an outpouring of leukocytes in those conditions of infection which have resulted in a leukopenia, until the white count corresponds with the intensity of the infection; and on the other hand, of a marked increase in the activity of the leukocytes in the ingestion of bacteria in the blood stream, amounting to 50 per cent increase.

It was early noted that in a high percentage of cases of ultraviolet blood irradiation, there was a prompt flushing of the skin, which often continued for days to weeks, and marked relief of cyanosis when present.

Miley,[8] in 1937 and 1938, examining the blood with refined chemical methods to determine the explanation of this, noted that in many different pathologic conditions there were abnormally low venous oxygen values, and that in such cases, after ultraviolet blood irradiation, there was a prompt and prolonged increase in the blood's ability to pick up oxygen, a reaction which must play an important role therapeutically. Heat favors this same increase in blood's ability to absorb oxygen, but it lasts only so long as the heat is applied. Ultraviolet blood irradiation is a therapy in which this improved oxygen absorption is maintained on a high level for 3 or 4 weeks following a single treatment.

This fact was confirmed by Lieutenant Commander Davidson,[9] in low pressure tank studies on pilots grounded for anoxia and bends, before and after ultraviolet blood irradiation, as published in U. S. Naval Medical Bulletin, and also by Eberhard[10] in conditions of inanition studied by him.

Rebbeck and Glassburn observed in about 100 patients the advanced pathological state of the blood fats in severe toxemias, transformed to the normal states following ultraviolet blood irradiations.

Eberhard[10] noted in cases of hypoproteinemia with disturbed albumin-globulin ratio, that the effect of this therapy increased the total proteins and balanced the albumin-globulin ratio.

Numerous workers have noted the often rapid improvement in the blood sedimentation rates following one or more blood irradiations with ultraviolet light.

X-ray evidence of the clearing of pneumonic processes in the lungs, and of the resorption of

calcium deposits in bursae, are other objective evidence of values of ultraviolet blood irradiation.

We recognize the desirability of further controlled study of all of these points and more.

In my own school, Georgetown University Medical School in Washington, D. C., an instructor in the Department of Physiology has chosen for a Ph.D. research project, the effects of ultraviolet rays on the respiration and oxygen metabolism of unicellular organisms and in simple tissues, in its application to ultraviolet blood irradiations in humans.

A second student, working for a master's degree in the Chemo-Medical Institute of Georgetown University Graduate School, is studying the chemical changes produced in certain proteins by ultraviolet rays, using the Knott hemo-irradiator for his exposures, and the time factors used in ultraviolet blood irradiation.

The clinical response to ultraviolet blood irradiation is the field that has interested me. I have given over 1,600 of them to more than 400 patients in the past three years.

We have found no contraindications to the use of this therapy as yet. Repeated examinations over a period of several years have not revealed any deleterious effects upon the blood elements or to any vital organs. Because of this we have not hesitated to use it in a wide range of conditions to find out what its usefulness or limitations may be. In approximately 1 in 100 cases we have had reactions of the order of chills lasting 15 to 30 minutes, on the day of the treatment, or a headache and a slight sense of depression on the same day. We have seen no serious reactions in over 1,600 blood irradiations.

We have used this therapy in patients aged less than 1 year to 89 years.

Our experiences correspond closely with the work already reported in medical and scientific journals by older workers in this field: Mr. Knott, Dr. Hancock,[11] Dr. Barrett, Dr. Miley and coworkers, Dr. Rebbeck and coworkers, covering its use in acute pyogenic infections,[12] peritonitis,[10] atypical pneumonia, puerperal sepsis,[13] postabortional sepsis,[14] blood stream infections,[15] acute thrombophlebitis,[16] intrinsic bronchial asthma,[17] poliomyelitis,[18] and as a preoperative build-up.[19]

Besides the above printed reports, ultraviolet blood irradiation is proving a constructive measure in connection with the treatment of many arthritides, and in combatting acute and chronic sinus infections, and in other difficult therapeutic problems.

I would emphasize its value to surgeons. Rebbeck,[19] a surgeon of considerable experience, reports excellent results from the use of ultraviolet blood irradiation in preparation for surgery.

Beyond any measure I have had any experience with, ultraviolet blood irradiation mobilizes the defensive and reparative mechanisms of the body on a very high level, a level sufficiently high that the body works with markedly increased efficiency in overcoming infections, and in promoting repair of damaged tissues.

Ultraviolet blood irradiation is a relatively new physical measure, which has greatly widened the range of service through the department of physical medicine to include some of the most serious problems faced by the various specialties in hospital practice.

It gives maximum results with a minimum of effort and time expenditure, and therefore is of special value in aged and feeble patients, hospitalized or ambulant.

Some of my colleagues find it hard to believe that such minute exposure of the blood to ultraviolet light, as in the Knott hemo-irradiator could possibly cause the therapeutic results reported in the literature.

In the Knott hemo-irradiator, 30 c. c. of blood flows each minute through an irradiating chamber holding 10 c. c. and 1 cm. deep. About 1/25th of the blood volume in the body is used, or more exactly, 1.5 c. c. of blood per pound of body weight, which amounts to half-pint in a 166 pound person. A series of baffle plates in the irradiating chamber, plus rhythmic pulsation from the transfusion pump, causes the blood to flow in a turbulent manner through the irradiating chamber, thus bringing different particles of blood into contact with the quartz window, for it is only against the quartz window that the blood has a chance to absorb ultraviolet rays, which is essential to chemical activity.

It is quite probable that any particular particle of blood receives but a fraction of a second exposure to ultraviolet radiation from the water cooled quartz burner set at 3 cm. distance.

How could such a brief exposure possibly be effective therapeutically? Clinically we do see therapeutic improvement, at times quickly and dramatically, at other times slight and gradual, and perhaps only after repeated irradiations.

An illustration from photography may possibly be helpful in understanding the above possibility.

In perhaps 1/100 of a second exposure of a light sensitive chemically coated plate, you have impressed on it a multitude of chemical changes which result in a perfect picture. Had the exposure been one second, the picture would be spoiled. The reaction time of light is critical and minute for a good picture.

So with ultraviolet rays, which are markedly more active in the shorter wave lengths than in the much longer visible rays, here also the reaction time is critical and even more minute.

In a recently published report in the *Journal of the American Medical Association*[20] it was stated that bacteria in a clear media exposed to ultraviolet rays were killed in 0.17 to 0.33 of a second, viruses in a clear media were killed in 0.33 to 0.66 of a second, without destroying their antigenic properties, and therefore this means was used in preparing potent vaccines. But the exposure time was critical. Longer exposures would have destroyed the antigenic properties also and made the vaccines of no value.

We have in the Knott hemo-irradiator a device which is designed to keep the blood irradiation time within the range of safe therapeutic results, determined originally by a considerable number of animal experiments, and verified in nearly 30,000 human blood irradiations in 12 years, and to reproduce therapeutically efficient exposures in the hands of different operators, and to be easy and safe in operation.

(IV) COLON IRRIGATIONS, FOR CLEANSING, TONIC AND DECONGESTIVE EFFECTS

The Physiological Basis.[21]—Colon movements are chiefly mass peristaltic movements of which the subject is unaware; occurring two to four times in 24 hours, each moving the contents of the colon about 18 inches. An intra-rectal pressure of 40 to 50 mm. of mercury stimulates a strong peristaltic contraction, which empties the colon as far back as/or beyond the splenic flexure.

Hurst showed in the human subject that when the rectum is inflated with air, the call to defecate becomes urgent, and then passes away; rapid reinflation caused the sensation to return and then again pass away as the pressure falls. This distension of the rectum can be accomplished by water and is the basis of my use of colon irrigation.

Dr. Fred D. LaRochelle,[22] of Springfield, Massachusetts, after a study of the advantages and disadvantages of the various colon irrigation devices, developed a simplified arrangement for colon lavage, which seems to me, after 10 years use of it, to have a sound physiological basis. It is economical in time of use, in care, simple to sterilize, and effective in results.

The lavage is given with the patient sitting on the toilet seat in the usual manner. The injection tip is a curved metal tube with a proper tip, which may be connected either with an injection bulb, or with an irrigation jar or large percolator. The patient usually introduces the well-lubricated tip himself, the water runs in slowly and continuously. The water temperature and the amount running in can be seen and controlled. As the rectum fills up, its walls are dilated and this stretching sets off the defecation reflex, which stimulates the mass movement of feces into the colon. The feces are passed out around the tip, the tip remaining in place. The anus is held shut during another filling and stretching and defecation reflex, then the bowel is emptied again. This repetition of the filling, stretching and emptying stimulates a sufficiently active movement of the colon to result in a thorough emptying of the whole colon in a short time, usually in less than 15 minutes.

In cases of atonic colons there is often seen a persistent normal stimulus operating for days without further stimulation. Only the tip needs sterilization. It provides its own pressure regulator, the defecation reflex, and the facility of voluntary emptying. It is adaptable to bedside or bedpan use.

Uses of the Colon Irrigation.—I use the La

Rochelle colon irrigation technic extensively because it is easily done. Most patients quickly learn to handle it themselves without the aid of a technician.

It is used by me in the following conditions: In diarrheas, at frequent intervals, to remove the irritant contents of the colon; in constipation; whenever there is a history or evidence of foul odors from the stool; in many cases of abdominal distention from atonic conditions, at times in connection with or after electric massage over the 8th to 10th dorsal nerve centers; as both a test for and a possible treatment in any case of urticaria; as a test for and possible treatment in cases of slightly elevated temperatures in children or adults; in many cases of arthritis it is important to test the value of colon irrigations; in many cases with symptoms of burning or aching sensations in legs or back; in children at the first signs of illness or lowered resistance; before treatments by hot baths or in fever cabinet unless there has been a recent adequate bowel movement; to aid in the relief of pelvic congestion or inflammations; and to favor contraction of uterus after labor, thus reducing chances of puerperal infection.

From extensive use of the enema and the colon irrigation, I am convinced that we have in this an essential therapeutic technic. You will never know what it can do without a trial, for yourself, for your patients.

(V) MANIPULATIVE TREATMENTS

Mennell's[7] "Physical Treatments" is one of our excellent guides in this line.

There are certain disabilities of the neck, the shoulder girdle, the hip girdle, of the back, of the knees, and of the feet, which are amenable to manipulation. It is important to have a history of the case, a physical examination and x-ray studies in many cases, to determine whether manipulative treatment is indicated and safe.

Neck disabilities amenable to manipulative technic, are usually of sudden onset, show stiff, sore muscles or wry neck. Neck stretching, with the Sayre head sling or by hand is the usual procedure. Repeat several times at a session.

A condition seen very commonly, a severe occipital headache with scalp neuralgia, often responds in a few minutes to digital pressure usually under the mastoid processes, at times over the first spine.

Shoulder disabilities amenable to manipulative technic are usually of sudden onset, with pains between shoulder blades and radiating down arm. At times this is difficult to differentiate from bursitis or myositis. Often the source of this pain is at a joint between rib head and vertebrae.[23] Manipulation seeks to open this joint slightly or rock it, by use of leverage. Relief is often dramatic in early cases.

Thoracic region disabilities amenable to manipulative technic are often of the rib head lesion type at fourth to tenth nerve roots one side. Symptoms are referred pains around ribs, over chest or heart or abdomen. They often arouse fears of heart or lung disease or appendicitis. Gentle manipulation seeks to stretch or rock joint at rib head, which can sometimes be done by crawling on all fours, or hanging and stretching.

Lumbar region disabilities are not often amenable to manipulative technic in my experience. I depend more on heat and electric massage in these cases. Bony anatomical deviations are often found here.

Sacro-iliac joint disabilities are often dramatically amenable to manipulation designed to stretch or rock the joint.

Knee injuries probably of the order of loosened or slightly displaced semilunar cartilages, can sometimes be aided by manipulation, by circumduction of leg with knee bent at right angles.

Most manipulations must be learned by observation and practice. The longer the interval between the onset of pain and the manipulative procedure, the more likely there are to be productive changes, due to irritation and disturbed circulation, and the more difficult to correct by manipulation.

Many of the disabilities amenable to manipulation are due to weakened muscles and tendons from sedentary habits and disuse, for strong muscles give one a large degree of protection against stress. The prophylaxis then is obvious.

Most manipulative technic is preceded by effective heating of the tissues, and by electric or hand massage. A gentle manipulative procedure is then more apt to be effective and pain free.

One has constantly to be alert in diagnosing conditions for which he may use manipulative treatments, to rule out salt deficiency, on the one hand, and malignant metastases on the other, or anatomic anomalies. X-rays provide protection against mistakes many times.

1125 Buchanan Street N.W.

BIBLIOGRAPHY

1. Bayliss, William Maddock: Principles of General Physiology, 3d edition, 1920, p. 42.
2. Boyce, F. F.: New Orleans Med. & Sur. Jr., **23**:18, 1940.
3. Murray, Clay Ray: Proper Place of Physical Therapy in the Treatment of Fractures. J.A.M.A., **96**:235-237 (July 24) 1931.
4. Dock, William: The Use and Abuse of Bed Rest. Conferences on Therapy by Members of the Departments of Pharmacology and of Medicine of Cornell University Medical College and the New York Hospital. New York State Jr. of Med., **44**:724-730, 1944.
5. Kraus, Hans: Muscle Rehabilitation by Active Exercise. Arch. of Physical Therapy, **24**:151-157 (March) 1943.
6. Hines, H. M., in collaboration with Thomas, J.D.; and Lazere, B.: Physiologic Basis for Treatment of Paralyzed Muscle. Arch. of Physical Therapy, **24**:69-73 (Feb.) 1943.
7. Mennell, James B.: Physical Treatment by Movement, Manipulation, and Massage. (Blakiston). The Use and Abuse of the Faradic Current, pp. 468-490. Philadelphia: P. Blakiston Son and Co.
8. Miley, G.: The Ultraviolet Irradiation of Autotransfused Human Blood; Studies in Oxygen Absorption Values. Amer. Jr. of Med. Sciences, **197**:873 (June) 1939.
9. Davidson, William M.: Ultraviolet Irradiation Relative to Anoxia and Bend Susceptibility. U. S. Naval Medical Bulletin, **43**:1 (July) 1944.
10. Miley, George P.; and Rebbeck, Elmer W.: The Knott Technic of Ultraviolet Blood Irradiation As a Control of Infection in Peritonitis. Review of Gastroenterology, **10**:1-26 (Jan.-Feb.) 1943.
11. Hancock, Virgil K.; and Knott, E. K.: Irradiated Blood Transfusion in Treatment of Infections. Northwest Medicine, **33**:200-204 (June) 1934.
12. Miley, George: Ultraviolet Blood Irradiation Therapy (Knott Technic) in Acute Pyogenic Infections. Amer. Jr. of Surg., **57**:493-507 (Sept.) 1942.
13. Rebbeck, E. W.: Ultraviolet Irradiation of Autotransfused Blood in the Treatment of Puerperal Sepsis. Amer. Jr. of Surg., **54**:691-700 (Dec.) 1941.
14. Rebbeck, E. W.: Ultraviolet Irradiation of Autotransfused Blood in the Treatment of Postabortional Sepsis. Am. Jr. of Surg., **50**:476-486 (March) 1942.
15. Hancock, Virgil K.: Treatment of Blood Stream Infections with Hemo-Irradiation. Amer. Jr. of Surg., **58**:336-344 (Dec.) 1942.
16. Miley, George: The Control of Acute Thrombophlebitis with Ultraviolet Blood Irradiation Therapy. Am. Jr. of Surg., **60**:354-360 (June) 1943.
17. Miley, G. P.; Seidel, R. E.; and Christensen, J. A.: Ultraviolet Blood Irradiation Therapy of Apparently Intractable Bronchial Asthma. Arch. of Physical Med., **27**:24-29 (Jan.) 1946.
18. Miley, George: Ultraviolet Blood Irradiation Therapy in Acute Poliomyelitis. Arch. of Physical Therapy, **25**:651-656 (Nov.) 1944.
19. Rebbeck, E. W.; Preoperative Hemo-Irradiations. Amer. Jr. of Surg., **61**:259-265 (Aug.) 1943.
20. Levinson; Milzer; Shaughnessy; Neal; and Oppenheimer: Production of Potent Inactivated Vaccines with Ultraviolet Irradiation. J.A.M.A., **125**:531-2 and 704-5 (June 24 and July 8) 1944.
21. Best, Chas. H.; and Taylor, N. B.: The Physiological Basis of Medical Practice, 1937, pp. 794-809.
22. LaRochelle, Fred D.: Colon Lavage: A New Apparatus. Amer. Jr. of Physical Therapy, Feb., 1930.
23. Goldthwait, Joel E.: The Rib Joints. New England Jr. of Med., **223**:568-573, 1940.
24. McCance, R. A.: Medical Problems in Mineral Metabolism. III. Experimental Human Salt Deficiency. Lancet, April 11, 1936, pp. 823-830.

RESULTS OF REMOVAL OF RUPTURED INTERVERTEBRAL DISCS AND COMBINED DISC-FUSION OPERATIONS*

AN ANALYSIS OF 288 OPERATIONS

By HAROLD H. KUHN, M. D.
Charleston, West Virginia
and
ROBERT G. NEILL, M.D.†
Durham, North Carolina

Since 1934, when Mixter and Barr[1] described the syndrome of herniation of the intervertebral disc, low back pain and sciatica, many papers and symposia on this syndrome and its treatment have been published. Conflicting opinions have been expressed concerning results of treatment and advisability of spinal fusion following exploration of the low lumbar spinal canal. Few papers have dealt with long follow-up studies to determine the late results of simple disc excision and of combined disc-fusion operations. In 1941, Barr and Mixter[2] found patients more improved if spinal fusion were done at the time of laminectomy. After laminectomy 52 per cent, and after laminectomy and fusion 73 per cent were relieved of back complaints.

This paper presents a study of 288 patients who were operated upon for herniation of lumbar intervertebral discs; exploration and simple disc excision or disc excision and spinal fusion were carried out. The material included in this study represents all patients operated upon at Duke Hospital for ruptured intervertebral discs from December 22, 1936, to December 31, 1943. The longest follow-up is 48 months, the shortest is 6 months, and the average follow-up is 21.5 months. Only patients diagnosed and explored for ruptured discs are included in this series.

*Read in Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

*From the Orthopedic Division, Department of Surgery, Duke University School of Medicine, Durham, North Carolina.

†Captain, Medical Corps, Army of the United States.

Patients who had spinal canal explorations at the time a back was opened for other purposes, fusion for spondylolisthesis, instability, and so on, are not included in these statistics.

There is a definite age and sex incidence comparable to that of other reports. No patients in the first decade of life were seen with this syndrome. Two patients in the second decade were operated upon, 54 in the third, 120 in the fourth, 77 in the fifth, 30 in the sixth, 4 in the seventh, and 1 in the eighth. Of the 288 patients, 188 or 65 per cent were males and 100 or 35 per cent females. The youngest patient was 17 years of age, the oldest 75 years, and the average age was 37.8 years. *Table 1* shows age and sex distributions.

History.—Most patients recall some trauma to the low back area such as lifting, slipping, falling, or chiropractic manipulations, and many experienced a "popping" or "snapping" sensation at the onset of the symptoms. Three patients dated their illness to childbirth, and in one the symptoms followed a lumbar puncture. Of these 288 patients, 183 or 63 per cent had some history of trauma. Various observers have listed trauma as an etiologic factor in intervertebral disc ruptures (*Table 2*).

CASES

	Male	Female	Total	Percentage
15 - 20 years	1	1	2	.7
21 - 30 years	43	11	54	18.5
31 - 40 years	71	49	120	41.7
41 - 50 years	47	30	77	26.8
51 - 60 years	21	9	30	10.5
61 - 70 years	4	0	4	1.4
71 - 75 years	1	0	1	.4
	188	100	288	100.0

Table 1

	Cases	Percentage
Barr[5]	58	77
Bradford and Spurling[4]	35	50
Fincher[6]	50	70
Peyton and Levin[6]	65	67

Table 2

Symptomatology.—The symptoms of a ruptured intervertebral disc have been well outlined in numerous articles. *Table 3* shows the incidence of common complaints in the present series.

Lumbar Puncture.—Spinal fluid protein determinations were made on 186 specimens. The protein was elevated in 82.3 per cent of patients from whom discs were removed. The results of protein determinations in this series are shown in *Table 4*.

Roentgenograms.—All patients in this series had roentgenograms of the lumbosacral spine. The usual anteroposterior and lateral views were made, and in addition, during 1942 and 1943,

ONSET	Cases	Percentage
Low back pain	155	54
Low back pain and sciatica	96	33
Unilateral sciatica	20	7
Bilateral sciatica	17	6
	288	100
DURATION		
Longest	20 years	
Shortest	1 day	
Average back pain	4.2 years	
Average sciatica	5.7 years	
	Cases	**Percentage**
Accentuation by movement	262	90
Accentuation with increased subarachnoid pressure	247	85
Intermittent symptoms	215	75
Numbness and tingling	207	72
Weakness of leg	76	26
PHYSICAL FINDINGS		
Positive straight leg raising	265	92
Localized tenderness over spinous process or transverse process at L4 or L5	249	86
Changes in lumbar lordosis	229	79
Scoliosis, away from side of lesion	186	61
Sensory changes, calf and foot	175	61
Weakness of dorsiflexors of foot	117	40
Tenderness over sciatic nerve in thigh	107	37
Fibrillary twitching	9	3
REFLEX VARIATION		
Decrease in ankle jerk	190	65.4
Decrease in knee jerk	9	3.8
Decrease in both	44	15.2
Negative examination	45	15.6

Table 3

oblique views were made. These oblique views were taken routinely to determine the presence of isthmus defects. There has been much discussion in the literature concerning a narrowed lumbar interspace and its significance in patients suspected of having a ruptured intervertebral disc. There were 93 patients, or 32.3 per cent of the total 288, who had radiographic evidence of narrowing of the fourth or fifth lumbar interspace. Of this 93, 53 patients or 56.9 per cent had discs removed from the narrowed fourth or fifth lumbar interspace. The relationship of narrowed lumbar interspace to operative findings is summarized in *Table 5*.

Myelography.—Contrast media were frequently used during earlier years when herniated disc operations were relatively uncommon. Recently this procedure has been reserved for doubtful cases or for more exact localization. Air was used in this series as a contrast medium in 10 patients, but because of poor radiographic contrast and headache, its use was discontinued. Iodized oil myelographic studies were done on 184 patients with a correct localization value in 151, or 82.1 per cent, verified at operation. *Table 6* shows an analysis of these studies.

Distribution of Herniated Discs.—Only those patients who had disc herniations at the third, fourth, or fifth lumbar interspaces are included in this study. There were 249 discs, or 95.7 per cent, removed at the fourth or fifth lumbar interspace. The incidence of distribution as reported by other observers is listed in *Table 7*.

The distribution of ruptured discs according to interspace level in the present series is shown in *Table 8*.

Determinations	CASES Disc found	Negative exploration
0 - 40 mgm.	29	3
40 - 80 mgm.	107)	16
	135 or 82.3 per cent	
80 plus mgm.	28)	3
	164	22

Table 4

	Cases	Operative findings
Narrowing of fifth lumbar interspace	45	Disc L 5
	23	Disc L 4
	2	Disc L 3
	1	Disc L 3 and L 4
	1	Disc L 4 and L 5
	10	Negative explorations
	82	
Narrowing of fourth lumbar interspace	8	Disc L 4
	1	Disc L 5
	2	Negative explorations
	11	

Table 5

Spinograms, 194

Iodized oil	184	Proved correct	151
Air	10	Proved correct	4

Iodized oil spinograms	Cases	Percentage
Correct	151	82.1
False positive	14	7.6
False negative	9	4.9
Negative	10	5.4
		100.0
Air spinograms		
Correct	4	40.0
False positive	1	10.0
False negative	5	50.0
		100.0

Table 6

	Third Space Per cent	Fourth Space Per cent	Fifth Space Per cent
Barr[3]		68	32
Mixter[7]		67	33
Peyton and Levin[6]		52	48
Love and Walsh[5]		45	55
Bradford and Spurling[4]		33	67
Duke Hospital	4.3	41.1	54.6

Table 7

	CASES Right	Left	Transverse	Total	Percentage
Third lumbar interspace	2	3	6	11	4.3
Fourth lumbar interspace	36	69	2	107	41.1
Fifth lumbar interspace	60	76	6	142	54.6

Table 8

Six patients had 2 discs removed, and 14 had transverse discs. Six of the 14 patients with transverse discs had unilateral sciatica, 7 bilateral sciatica, and 1 no sciatica.

Treatment.—Conservative treatment has been used during the initial episode of pain, recent exacerbation of pain, or when the symptoms were not of sufficient severity to warrant operative intervention. The patient was placed on a sponge rubber mattress with a fracture board between the mattress and springs, received daily physical therapy consisting of heat and massage, and sedation as indicated. Buck's extension was sometimes used. If the symptoms subsided satisfactorily, the patient was discharged wearing a low back support. These conservative measures have frequently given relief of pain, particularly with patients whose pain radiated only to the buttock and thigh. Severe pain and continued or recurrent attacks of pain are indications for surgical removal if permanent relief is sought.

During earlier years, patients were subjected to more or less complete laminectomy or hemilaminectomy. Since 1941, an interlaminal approach has been used. This has proved satisfactory for both unilateral and bilateral exposures. Since the use of the interlaminal approach, the disc sinus and interspace have been routinely curetted. Ghormley, et alii,[9] have suggested that 14 per cent of all patients with herniated lumbar discs should have a combined disc operation and spinal fusion. There is general agreement that removal of the protruded disc will relieve more patients of sciatica than of backache. The decision to perform spinal fusion is made by the orthopedist from age, general condition, occupation of the patient, history, clinical findings, and roentgenograms. If back pain has been a major complaint, and an unstable back can be demonstrated clinically and radiographically, combined disc excision and spine fusion should be done. A modified Hibbs type of spinal fusion has been used, and in most cases the fourth and fifth lumbar vertebral arches and sacrum were stabilized. Scarcity of bone for grafting purposes is overcome by removing long cancellous grafts from the posterior iliac spine.

Results of Operation.—Prior to December 31, 1943, 288 patients presumed to have ruptured intervertebral discs were explored and 260 discs were removed from 254 patients. Excellent* end results in patients who had disc excision alone were obtained in 51 patients, satisfactory in 107, unsatisfactory in 24, and no follow-up was obtainable in 23. Eight patients had a second exploration because of recurrent backache and sciatica. Only instability was found in 4 patients, and two satisfactory (A) and two unsatisfactory (AB) end results were obtained. Three of the remaining 4 re-explorations had additional material removed at the same interspace with one satisfactory (A), and one unsatisfactory (A) result; in one case no follow-up was secured. The remaining patient had a disc removed at a different level with an unsatisfactory (A) end result. There were 27 patients who had negative explorations. Three patients obtained excellent end results, 15 satisfactory, 9 (A), 1 (B), and 7 unsatisfactory, 1 (A) and 6 (AB). There were 2 patients who had no follow-up.

An additional group of 9 patients with recurrence of backache and sciatica had re-explorations followed by spinal fusions. One patient had a small piece of fibrocartilage removed from the original disc site, and the remaining 8 explorations were negative. However, all had definite instability of the fifth lumbar vertebra. Excellent end results were obtained in 4 patients, satisfactory in 5 patients; one (B) and four (AB). Disc excision and spine fusion were done on 40 patients. There were 18 excellent and 14 satisfactory end results: four (A), one (B), and nine (AB). No follow-up could be obtained on 8 patients. An additional group of 7 patients presumed to have ruptured intervertebral discs had negative explorations followed by spine fusion. There were 4 excellent and 1 satisfactory (AB) end results. No follow-up could be obtained on 2 patients.

Table 9 shows an analysis of the end results.

These patients noted improvement over a two-year period. Many patients had results during the first year classified as unsatisfactory, but

*Patients classified as obtaining excellent results were asymptomatic and resumed former occupations. Patients with satisfactory results were improved, felt that operation was a success, but still had back or leg pain or both. Patients with unsatisfactory results were unimproved or made worse. A denotes back pain, B leg pain, and AB back and leg pain.

the majority of these had satisfactory end results in 18 to 24 months.

SUMMARY

There were 222 patients or 77 per cent who had either excellent or satisfactory end results following operations for lumbar ruptured intervertebral discs. Thirty-one patients or 11 per cent had unsatisfactory postoperative end results and 35 or 12 per cent were not followed. There were no operative deaths or major postoperative wound infections.

CONCLUSIONS

(1) Lumbar ruptured intervertebral discs occur most frequently in men during the fourth decade.

(2) Low back pain preceded by trauma is the presenting symptom in the majority of these patients.

(3) In this series, ruptured intervertebral discs occurred most commonly on the left side and 95.7 per cent protruded from the fourth or fifth lumbar interspace.

(4) Since only 18.4 per cent of these patients had radiographic evidence of a narrowed interspace from which a ruptured disc was removed, the significance of this preoperative finding is questionable.

(5) Conservative treatment relieves symptoms in many cases. If conservative measures fail to relieve pain, operative removal of the lesion is justified.

(6) Generally, patients under 50 years of age who expect to return to heavy work will obtain a more satisfactory result if disc excision is followed by spine fusion.

RESULTS OF 288 OPERATIONS, AVERAGE FOLLOW-UP 21.5 MONTHS

	Excellent	Satisfactory	Unsatisfactory: A	B	AB	A	B	AB	No follow-up	Total
Disc excision	51	107	40	9	58	24	5	1 18	23	205
Negative explorations	3	15	9	1	5	7	1	6	2	27
Combined disc excision spine fusion	18	14	4	1	9				8	40
Negative exploration spine fusion	4	1			1				2	7
Re-explorations and spine fusion	4	5		1	4					9
										288

Table 9

BIBLIOGRAPHY

1. Mixter, W. J.; and Barr, J. S.: Rupture of the Intervertebral Disc with Involvement of the Spinal Canal. New England J. Med., **211**:210-215, 1934.
2. Barr, J. S.; and Mixter, W. J.: Posterior Protrusion of the Lumbar Intervertebral Discs. J. Bone Joint Surg., **23**:444-456, 1941.
3. Barr, J. S.: Sciatica Caused by Intervertebral Disc Lesions. Bone and Joint Dis., **19**:323-342, 1937.
4. Bradford, F. K.; and Spurling, R. G.: Intraspinal Causes of Low Back Pain and Sciatic Pain. Surg. Gyn. and Obst., **69**:446-459, 1939.
5. Fincher, E. F.: Neurologic Aspects of Low Back Pain and Sciatica. Ann. Surg., **109**:1028-1033, 1939.
6. Peyton, W. T.; and Levin, J. D.: Posterior Herniation of the Intervertebral Disc. Minn. Med., **27**:263-273, 1944.
7. Mixter, W. J.: Rupture of the Lumbar Intervertebral Disc. Ann. Surg., **106**:777-787, 1937.
8. Love, J. G.; and Walsh, M. N.: Protruded Intervertebral Disc. J.A.M.A., **111**:396-400, 1938.
9. Ghormley, R. K.; Love, J. G.; and Young, H. H.: The "Combined Operation" in Low Back and Sciatic Pain. J.A.M.A., **120**:1171, 1942.

DISCUSSION (*Abstract*)

Dr. Lenox D. Baker, Durham, N. C.—In the discussions of these papers there have been mentioned several methods for fusing the spine and for getting the intervertebral spaces open. Some time ago there was a report, I believe, by Dr. Don King on the use of screws through the articular facets as an adjunct in stabilizing the spine. In March of this year, we started using vitallium screws in the articular facets as a modification of the Hibb's fusion operation. We did it, hoping they would control early pain, would allow the patient to be up at an earlier date, and would hold the spine in the desired position for fusion. There was no change in details of the Hibb's operation. The screws are not in any sense of the word used as a substitute for bony fusion. They are used to produce immediate rigid immobilization and to hold the fixation until bony fusion takes place.

In putting the screws in, care must be taken to avoid the danger of getting the screws into the intervertebral foramina. The first patient in which we used interfacet screws was a two hundred and twenty pound male. The third postoperative day, he could turn in bed easily with no apparent pain and insisted on being up and about. We allowed him up forty-eight hours following his operation. (We count the day of the operation as the first postoperative day.) He was fitted with a supporting corset and left the hospital walking at the end of seven days. This is what one patient did, but is not necessarily what we advocate.

The next patient in whom the screws were used, was a nurse who worked in our clinic. She was allowed up the fourth postoperative day and left the hospital within ten days walking. At the end of six weeks she was back on duty in an Army camp.

The third patient we tried the screws in had just as much pain as we usually see following spinal fusion. We did not think the screws were of any help.

Another patient was up the fifth day and left the hospital the eighth day wearing a corset type of support. This patient is a farmer. We saw him six weeks and one day after his operation. He was having no back pain and said that two days before he had help get in six cords of wood.

Interfacet screws have been used in ten patients. Six of the patients have had a decrease in postoperative pain and have been able to get up earlier than we have allowed in the past. Four of the patients were not helped apparently by the screws. They had as much postoperative pain as we have been accustomed to seeing in spinal fusion cases. The screws cannot be used in all spinal fusions as the facets do not always lie in a plane in which the screws can be placed.

Dr. Earl D. McBride, Oklahoma City, Okla.—I have put screws almost everywhere, but I have not put them into the spine as yet. I do not believe that Dr. Baker will keep up this procedure.

In the first place, I do not see much need for a screw in that location. There is nothing that will get out of place. The facets are fixed objects. They cannot separate or change much mechanically. A simple fusion is all that is necessary.

As far as getting the patient up earlier is concerned, I have lowered the recumbencies to about ten days. At this time the patient is turning over in bed very comfortably, the muscle spasm is relaxed, the sciatica is gone, and I apply a short body cast and let the patient up.

I have had no trouble with any symptoms relative to the fusion of the facets. We put on a low-back corset or support and permit exercise. The only trouble with relation to facet fusion, which has been described by Dr. Compere, is that you cannot prove that the back is fused, by x-ray or any other means. The clinical results, in my hands, have been good.

Dr. Kuhn (closing).—More recently screws were placed across the facets, following which we were able to grasp the spinous process with a Kocher clamp and almost lift the patient from the table, demonstrating marked stability.

In the follow-up studies on these cases, we generally obtained oblique views to show definite facet fusion. Furthermore, it is possible with flexion and extension to show whether one has a pseudarthrosis by superimposing the films to determine a point of false motion.

In regard to the question on results, when we began collecting statistics, we had done fusions for approximately fifteen to eighteen months. Most of the patients were being fused at that time. There was no particular selection used. We did not operate on elderly patients who could not tolerate the operation. There is no point in doing fusions in elderly individuals who do not expect to return to heavy work.

We have fused patients up to fifty-two or -four years of age, farmers who had no way to make their livelihood except farming. We have done localized fusions on those and have obtained good results.

Out of the fifty-six patients who had a disc exploration, there were seven negative explorations that were fused. Of this fifty-six, none had what I would term an unsatisfactory end result. Some of them had back pain, some leg pain, but the majority of them were classed as having a satisfactory end result from the standpoint that they would go through the same operation to obtain what they had, and I think that is a good criterion.

Southern Medical Journal
JOURNAL OF THE
SOUTHERN MEDICAL ASSOCIATION

Copyright, Southern Medical Association, 1946. Published monthly by the Southern Medical Association, Empire Building, Birmingham 3, Alabama. Annual subscription, $4.00. Single copies 35c each.

Entered as second-class matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

Volume 39 SEPTEMBER 1946 Number 9

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Fortieth Annual Meeting
Miami, Florida, November 4-7, 1946

WEIGHT GAIN AND FLUID BALANCE IN PREGNANCY

Many observers have stressed the importance of not permitting the mother to gain weight excessively during pregnancy, and various methods of preventing it are advocated. In the nineteen twenties it was believed that the less the mother ate the smaller the baby would be. Later it was urged that exercise of the mother was more effective than dietary restriction. Loughran[1] of Brooklyn has reviewed a large series of office cases to compare figures on weight gain and the various obstetrical complications. In his series, the number of complications roughly paralleled the weight increase. He describes a routine which has greatly reduced complications in his obstetrical cases in the past ten years.

A high protein low carbohydrate diet is prescribed, with abundance of green and yellow vegetables, fruits and milk and added vitamins. The patient is watched and her weight gaining tendencies are determined early in pregnancy. Calory, salt and fluid restriction are employed to prevent gain. If edema is observed, the blood protein level is determined, since hypoproteinemia is to be avoided as a precursor of edema, and possibly hypertension and eclampsia. He advocates a weight increase of not more than fifteen pounds; and in obese women no increase. If weight increase is too rapid magnesium sulphate is used for fluid evacuation. A similar routine is employed in many obstetrical centers. Physicians[2] in Boston and Cleveland report successful treatment of two cases of hydramnios by diuresis with ammonium chloride.

Loughran[1] has encountered no toxemia since beginning the described routine, and no death from eclampsia. He reports a low incidence of abnormal presentations; few cesarean sections for bony and soft tissue dystocia, a low stillbirth rate, and marked diminution in the length of labor. The average period of labor for primiparas who had gained no more than fifteen pounds was slightly more than seven hours. The average labor time given by DeLee for primiparas is eighteen to twenty-seven hours.[1] Loughran reports a definite lengthening of the period of labor as weight gain increased. Labor was longer even in the group which gained twenty pounds, than in the fifteen-pound group.

Although obstetrical mortality and morbidity rates have improved in the past decade, there is no evidence that treatments such as drug diuresis and salt restriction are not still purely symptomatic. Sodium chloride is one of the largest and most essential mineral components of all living tissue. Its deprivation undoubtedly has many effects other than those upon water accumulation.

A woman may gain as much as fifty pounds during gestation without elevation of blood pressure or other notable complications, and lose it immediately after delivery if she nurses her baby. Those who do not nurse tend to become obese. Since the anterior pituitary gland, and the gonadotropins are greatly altered in

1. Loughran, Charles H.: Weight Control, Diet, and Fluid Balance in Pregnancy. Amer. J. Obst. and Gyn., **52**:42 (July) 1946.

2. Abrams, Archie A.; and Abrams, S. B.: Successful Treatment of Hydramnios with Ammonium Chloride. A Preliminary Report. Amer. J. Obst. and Gyn., **52**:299 (Aug.) 1946.

gestation, their levels in blood and urine should be correlated with weight gain of the patient and with fluid metabolism. Fluid balance should be better studied not only in its relation to hormone levels in pregnancy but to the metabolism of many normal dietary components such as vitamins, minerals, amino acids and complete proteins. Eventually, too great lability of water may be controllable by a hormone, and the hormone deficiency itself in turn preventable by improved nutrition.

The hydration of pregnancy may be merely a greatly exaggerated and acute form of the more slowly developing obesity and hypertension of middle age or of other periods of life.

CAUSE OF CANCER

For many years science has seemed to be on the verge of demonstrating the always elusive specific cause and therapy for malignant growths. The wealth of laboratory data now available is still confusing. The Rous fowl sarcoma, transmitted by a filterable virus more than thirty years ago, capable of being reproduced indefinitely in fowls, seemed to suggest that cancer was a contagious disease, and that bacterial causative agents for mammalian tumors would be demonstrated. The irritation theory was rather well established with the discovery of the experimental tar cancers, which follow repeated painting of an animal's skin with the irritating substance. Repeated clinical observations of skin and mouth cancers confirm the irritation theory.

Maud Slye's work, showing that susceptible strains of mice could be bred which would develop a large percentage of spontaneous cancers, seemed to show that cancer or a tendency to it is inherited. Bittner[1] in 1936 demonstrated that in the high breast cancer mice, actually the carcinogenic factor is not inborn but transmitted to the nursling through the milk. Low cancer mice nursed by high cancer mothers developed a high percentage of breast cancers. High cancer mice nursed by low cancer mothers remained relatively free of cancer. The breast milk seemed to contain the carcinogenic factor, and the Slye breast cancer was apparently ingested in infancy rather than inherited.

There are of course the inoculation cancers which are commonly maintained in laboratories. Cancer cells may be transmitted by direct inoculation from one animal to another. Accidental human inoculations have been reported during surgical extirpation of malignant growths. Recently reports have come from Texas that malignant tumors may be cultivated upon fertile eggs, and that filtrate of egg yolk upon which a malignant mammalian tumor has developed will quickly cause cancerous growth in rats. This if confirmed would show for the first time a mammalian tumor transmitted by a filterable agent, presumably a virus.

Investigators[1] at Columbia University, however, after careful study of the above report and its methods, attempted to repeat the studies of transmission through a filterable virus. In their work the rat tumor could be cultivated like bacteria upon fertile egg, but they could obtain no growth from a cell-free filtrate of the egg yolk. They produced tumor by inoculating animals with cells from the egg tumors, and from the nearby yolk if it was unfiltered; and they showed that the yolk about the tumors contained tumor cells. They believe that mammalian tumor is still transmissible by cell inoculation only, not by any filtrate which can be prepared from an egg yolk culture.

Their demonstration of cells in egg yolk around the experimental egg tumors emphasizes the invasive character of a malignant growth. The tumor cells did not remain in an encapsulated area but early diffused from the central foci, and from the fluid medium isolated cells were responsible for tumors in another host. This supports the clinical belief in the importance of removing a malignant growth not merely locally, but also of simultaneously removing a large area around it, as in the radical operations

1. Twombly, Gray H.; and Meisel, Doris: The Growth of Mammalian Tumors in Fertile Eggs. Is a Filtrable Cancer Virus Produced? Cancer Research, 6:82 (Feb.) 1946.

employed for surgical extirpation of most malignant growths.

Eventually it may be concluded that malignant growths have not one but many causes; that malignancy is merely another example of the limited number of reactions of which living tissues are capable. There are more ways than one of starting a malignant cycle.

OXYGEN AND GLUCOSE

Among the disturbances of an airplane pilot during high altitude flying is probably one in sugar metabolism, which usually becomes less as he becomes accustomed to exposure to low atmospheric pressures. Workers[1] at the University of Virginia have shown that oxygen lack in rats produces hypoglycemia if the animals have been fasted; but that well-fed rats after a period of anoxia or exposure to low atmospheric pressures, do not show a lowered blood sugar.

It was attempted to learn whether glucose feeding during anoxia would prevent hypoglycemia in the fasted animals. Rats were exposed to low barometric pressure, then given glucose by stomach tube and returned to the low pressure chamber. In all instances the blood sugar of anoxic rats rose to abnormally high levels after glucose feeding. It averaged 192 mg. per cent in two hours. At the same time the liver glycogen of the anoxic animals was low, as was the heart glycogen. Glycosuria followed, or what the investigators call an anoxic diabetes. Since others have shown that blood insulin increases during anoxia, they feel that the condition must be fundamentally different from pancreatic diabetes, in which the insulin supply is curtailed. It provides a further method of studying carbohydrate metabolism, and further proof that supplying of sugar to a blood that is hypoglycemic does not necessarily correct the blood sugar level but may have wholly undesirable effects. Abundant oxygen in the blood is of course essential to the burning of glucose.

1. Middlesworth, L. Van: Glucose Ingestion During Severe Anoxia. Amer. J. Physiol., **146**:491 (July) 1946.

TWENTY-FIVE YEARS AGO

From Journals of 1921

Nurses' Training.[1]—We are wont to deplore the lack of really scientific training of nurses, and at the same time we fail to consider that most of the hospitals that graduate them have a hard struggle to exist, and hence are in no position to elevate the nursing profession through better theoretical instruction, by introducing laboratory courses, by establishing an eight-hour nursing day, and by devoting more hours to instruction. Fortunately the legislatures of California and New York have had the vision to make it mandatory that nurses be not forced to work over eight hours in the twenty-four.

It is with immense gratification that we note the movement that is on foot to raise a million dollars for the endowment of the School of Nursing of the Johns Hopkins Hospital. Of this Dr. William H. Welch, Director of the School of Hygiene and Public Health of the Johns Hopkins University says in part:

"I consider the endowment of training schools for nurses one of the most urgent needs of the present day not only for the better education of nurses for the sick but also to meet the crying need for the training of public health nurses * * *

The time is not far distant when the unendowed training school for nurses will be as much of an anomaly as the unendowed medical school, and as little capable of meeting its responsibilities to its pupils, the medical and sanitary professions and the public."

Hot Springs Meeting, Southern Medical Association.[2] The great curative value of the Hot Springs waters is attributed to radio-activity. It was the Interior Department of the United States Government that employed Professor Bertram B. Boltwood, of Yale College, to make a test of the springs here and this renowned authority on radium reached the following conclusion:

"The waters of the Arkansas Hot Springs are radioactive to a marked degree. The radio activity of the waters is due to dissolved radium emanuation (a gas) * * *

Special reduced round trip rates on all railroads have been granted the Southern Medical Association for doctors attending the Hot Springs meeting * * * Numerous inquiries are being received by Dr. Allen H. Bunce, Secretary Medical Association of Georgia, * * * regarding the special train which will be operated by the Medical Association of Georgia, to Hot Springs, Arkansas, for the meeting.

1. Editorial. An Endowed Nurses' Training School. Sou. Med. J., **14**:582, 1921.

2. Hebert, W. J.: The Hot Springs Meeting. Sou. Med. J., **14**:753, 1921.

Book Reviews

Synopsis of Gynecology. Based on the Textbook Diseases of Women. By Harry Sturgeon Crossen, M.D., F.A.C.S., and Robert James Crossen, M.D., F.A.C.S. Third edition. 253 pages, with illustrations. St. Louis: The C. V. Mosby Company, 1946. Price $3.00.

This book owes its usefulness to its small size which makes it easy to carry in a coat pocket, and to its reasonable price. In most other respects it is approximately the same book as the standard text, "Diseases of Women," by the same authors, upon which it is based. It contains 253 pages, as compared to 948 pages of the larger book. Smaller type is used which allows more reading material for each page, and only a few necessary illustrations are included.

It would appear to be of more value as a reference for the resident hospital staff or practicing physician than for the medical student, because of its lack of illustrations.

Classic Descriptions of Disease. With biographical sketches of the authors. By Ralph H. Major, M.D., Professor of Medicine, University of Kansas School of Medicine. Third edition, revised and enlarged. 679 pages with 158 illustrations. Springfield, Illinois: Charles C. Thomas. Publisher, 1945. Price $6.50.

Major's "Classic Descriptions of Disease," presented now in its third edition, has become a medical classic. In his arduous day-by-day life and overwhelmed by publications which stress advances and therapeutic triumphs of recent origin, the physician of today is prone to forget his debt to the past and to feel, like Alexander, that soon there will be no worlds to conquer Dr. Major's text affords delightful and stimulating reading; it presents excerpts from the original accounts which have furnished the foundation of knowledge of clinical medicine; it demonstrates the keen observations and perspicacity of the older physicians, and it cannot but prompt one to sharpen his wits and mind to meet a problem of today, as it describes the great accomplishments of the men of the past with the limited facilities at their command.

The current third edition offers a few additional classic descriptions, is more profusely illustrated and more expensively bound than its predecessors, and introduces a bibliography in which references can be found to the best biographies written about the men whose contributions are presented in the text. Thus the reader is afforded the opportunity conveniently to supplement his knowledge of a contributor, should he so desire, beyond the short, sharply drawn, richly informative sketch which precedes each writers' classic description. Already Dr. Major has included descriptions of most familiar diseases and future discoveries will be required to furnish the material to add to his work. Perhaps worthy of entry in editions to come are excerpts from von Recklinghaupen's and Fuller Albright's papers on hyperparathyroidism and from Seale Harris' articles on hyperinsulinism.

In summary, Dr. Major's book most fittingly belongs on the medical student's shelf and in the physician's library.

Penicillin Therapy Including Thyrothricin and Other Antibiotic Therapy. By John A. Kolmer, M.S., M.D., Dr. P.H., Sc.D., LL.D., L.H.D., F.A.C.P., Professor of Medicine in the School of Medicine and the School of Dentistry, Temple University. 302 pages. New York: D. Appleton-Century Company, 1945. Cloth $5.00.

This concise text has appeared within the year and the fact that certain sections already seem obsolescent illustrates the rapid progress of chemotherapy. Recent developments in the field of antibiotics predominantly have dealt with the clinical efficacy of penicillin administered orally; with prolongation of the drug's action by injection of suspensions in beeswax and peanut oil and by other devices; and with the pharmacology, toxicity and clinical evaluation of streptomycin—which subjects Dr. Kolmer barely discusses in his volume. Likewise the relative value of penicillins F, G and X receives scant treatment while the implication that the agent may be useful in typhus fever (p. 92) has not been substantiated.

None the less, Dr. Kolmer's text remains quite valuable for its presentation of the fundamentals of chemotherapy and for its thorough discussion in separate chapters of the disease groups in the therapy of which penicillin has earned its place as the great medical advance of the century. It is to be hoped that future editions will keep pace with advances in antibiotic therapy and which will elaborate more fully upon the mechanisms behind the medically successful action of the antibiotic agents.

Electrocardiography in Practice. By Ashton Graybiel, M.D., and Paul D. White, M.D. Second edition. 458 pages with illustrations. Philadelphia: W. B. Saunders Company, 1946. Price $7.00.

This is the second edition of a book that has already reached widespread popularity, not only because of the careful preparation and organization of the text, but also because of the excellence of its electrocardiographic reproductions. The authors have not attempted to enter into a detailed discussion of the fundamentals of electrocardiography; instead they have provided with care, accuracy, and completeness, the practical clinical and pictorial aspects of electrocardiography. This atlas is divided into five parts, namely: Physiologic Principles and Technic, Variations in the Normal Electrocardiogram, the Arrhythmais, Etiologic Types and Patterns, and Electrocardiograms for Practice in Interpretation. This division, together with careful indexing, permits ready access to the particular subject matter and electrocardiographic pattern which are sought. All common electrocardiographic variants are illustrated and

discussed. The text has been brought up to date by the addition of a brief discussion, with illustrations, of multiple precordial leads. The book is a most useful electrocardiographic guide and reference.

Pneumoperitoneum Treatment. By Andrew Ladislaus Banyai, M.D., F.A.C.P., F.C.C.P. 396 pages with illustrations. St. Louis: The C. V. Mosby Company, 1946. Price $6.50.

There are probably more books written on tuberculosis than on any other disease. This one, however, fills a definite need, and will be more than welcomed by those treating tuberculosis.

This excellent monograph on pneumoperitoneum, by Dr. Banyai, presents the subject from every possible angle. Indications, contraindications, technic and complications are well presented. Considerable original work and painstaking detailed studies are evident. The increasing use of pneumoperitoneum in the treatment of selected cases of tuberculosis needs to be guided properly by the authoritative information which this book well supplies.

The Diagnosis of Nervous Diseases. Ninth edition. By Sir James Purves-Stewart, K. C. M. G., C. B. Knight of St. John of Jerusalem, M. D. Edin, F. R. C. P. Consulting physician to Westminster Hospital to the West End Hospital for Nervous Diseases and to the Royal National Orthopedic Hospital. 880 pages with illustrations. Baltimore: The Williams and Wilkins Company, 1945. Price $11.00.

The ninth edition of this well known book was extensively revised during the war and many of the author's manuscripts and illustrations were lost when the ship carrying them was sunk by enemy action. It omits instructions in the treatment of nervous diseases, but is encyclopedic in the field of diagnosis and is profusely illustrated with many striking photographs and drawings.

The first two chapters are concerned with physiological anatomy, and are not so up to date as could be wished. It is implied that acetyl-choline is a transmitter of the nerve impulse only at the synapse whereas Fulton and Nachmansohn have conclusively shown that this substance operates in transmission of nerve impulses along fibers as well as at the synapse. It is stated that the red nucleus is the center for labyrinthine righting reflexes, whereas Ranson and others have shown that these reflexes are integrated at the level of, but not in the red nuclei. In the discussion of the caudate and putamen (page 25), no mention is made that these nuclei are anatomically and physiologically continuous. This section also says that sensations of light touch, temperature and superficial pain are all carried in one spinothalamic tract, rather than that touch is carried in a separate ventral spinothalamic, as is generally accepted. In the discussion of the cerebellum the old terminology which ignores clinico-physiological correlations is used.

It is doubtful that most non-analytic neurologists or psychiatrists would go so far as to agree that "The Freudian doctrine is a mystical phallic religion of regressive type . . . endeavoring by suggestion to reinstate the dominance of sexual obsessions, perversions and bestialities, which modern civilized education has succeeded in moderating."

The section on psychometric procedures makes little mention of recently developed technics and gives in detail the old Binet-Simon test which is too long for office use and is of questionable value in adults.

The section on coma, delirium, unconsciousness and stupor is a mine of clinical information. The chapters on convulsive phenomena are not closely correlated with modern electro-encephalographic findings but are complete from a clinical viewpoint. The discussion of upper and lower motor neuron lesions, incoordination, disorders of sleep, pain, and abnormalities of sensation can be read with profit by any neurologist. In the chapter on aphasia the "cortical-subcortical" classification is used which in the experience of the reviewer is difficult to apply clinically. A newly added chapter on electrodiagnosis and electroprognosis is a concise summary of contemporary thought in this field. An excellent chapter on intracranial tumors completes the book.

This volume is highly recommended to those having a special interest in diseases of the nervous system, but it is not suitable as a general textbook of neurology for students.

A Textbook of Surgery by American Authors. Edited by Frederick Christopher, B.S., M.D., F.A.C.S., Associate Professor of Surgery, Northwestern University Medical School. Fourth edition, revised and reset. 1,548 pages with 1,483 illustrations and 762 figures. Philadelphia and London: W. B. Saunders Company, 1945. Price $10.00.

A wealth of up-to-date information is available in this volume, which is presented by various carefully selected contributors.

It contains the tested and accepted present day principles of American surgery.

The present edition contains two entirely new sections: one on military surgery by Col. Edward D. Churchill, Consultant in Surgery in the North African Theater and Professor of Surgery at Harvard Medical School; and the other on chemotherapy in surgical infections, by Dr. John S. Lockwood, Associate Professor of Surgery in Yale Medical School. The latter describes in detail the uses of penicillin and the sulfonamides. Other entirely new sections include the following: actinomycosis, by Dr. Owen H. Wagensteen; burns by Dr. Oliver Cope; shock by Dr. Alfred Blalock; indolent ulcers by Dr. Louis G. Herrmann; vascular tissue tumors, by Dr. Arthur Purdy Stout; tumors of the sympathetic nervous system by Dr. William De W. Andrus; fractures of the radius and ulna by Dr. Harrison L. McLaughlin; tumors of the breast, by Dr. Alexander Brunschwig; inflammations of the chest wall,

by Dr. William E. Adams; wounds of the thorax, by Dr. William F. Rienhoff, Jr.; pilonidal sinuses and cysts, by Col. Idys Mims Gage; the peritoneum, by Dr. Harold D. Harvey; diverticulitis and ulcerative colitis, by Dr. Richard B. Cattell; unusual hernias, by Dr. J. Dewey Bisgard; diverticula of the urinary bladder, by Dr. Charles Huggins; diseases of the vulva, by Dr. H. Close Hesseltine; and vaginal fistulae by Dr. Virgil S. Counseller.

Two contributors, Dr. Mont R. Reid and Dr. Willis C. Campbell have been lost by death. Dr. Mont R. Reid's section on wounds have been revised by Dr. Jonathan E. Rhoads and Dr. Sanford R. Gifford. Dr. Willis C. Campbell's sections on dislocations have been revised by Dr. J. Spencer Speed; and Dr. Evarts A. Graham's section on the islands of Langerhans has been revised by Dr. Nathan A. Womack. The sections on varicose veins and venous thrombosis have been revised extensively by Dr. Geza de Takats and the section on the autonomic nervous system by Dr. James C. White.

There are a large number of illustrations and figures. This very valuable book is beautifully printed and sturdily bound in cloth. The index is unusually complete.

A Manual of Surgical Anatomy. Prepared under the auspices of the Committee on Surgery of the Division of Medical Sciences of the National Research Council. By Tom Jones and W. C. Shepard. 254 pages, with illustrations. Philadelphia and London: W. B. Saunders Company, 1945. Price $3.00.

Since this book is called a manual, it is important to point out that its first 140 pages are an atlas. The drawings by the authors, two of this country's greatest medical artists, are excellent. The plates illustrating various regional dissections cover the subject so well that the book serves quite satisfactorily as an atlas for first-year medical students in gross anatomy. In addition to this there are many illustrations of surgical approaches and similar specialized subjects which make the book valuable to students in surgical anatomy, interns, residents or others seeking information about unaccustomed surgical procedures. Most of the plates are in color and the labelling is clear and effective.

The last 114 pages are occupied by an "Explanatory Index." The listing is comprehensive. Important synonyms are given and also a sentence or two of definition or explanatory comment. The references to pages are frequently multiple, giving all the pages on which the structure is illustrated. Many structures are listed which do not appear or are not labelled in the plates, but this gives greater completeness and the usual brief description largely makes up for the lack of illustrations.

The contributors to this cooperative undertaking seem to have been aptly chosen and each has done his part well. It is astonishingly small for an atlas, slender, sturdily bound in flexible covers, and designed for use in the field.

Miami—Where We Meet

MIAMI, YESTERDAY AND TODAY*

1896-1946

Miami celebrated its fiftieth anniversary as a city in July. When the members of the Southern Medical Association hold their meeting here in November, they will surely find it hard to realize that in 1896 this southernmost metropolis of the United States with its "young New York" skyline was a wilderness of rocky woods with only two resident families, the Brickells south of the Miami River, and the Tuttles to the north.

When they see broad Biscayne Boulevard, lined with stately royal palms and fine buildings, and the other thoroughfares of the city with their throngs of shoppers and streams of traffic, it will be almost impossible to reconcile this go-ahead metropolis with the fact that only fifty years ago there were no roads here at all, only three not very good trails, one out to Lemon City, one to Coconut Grove and one in Allapattah, all sections well within the city limits of present-day Miami.

Indeed, the only communication was by sailboat which was exactly how the mail was carried to Lemon City, thence by stage north to Lantana on Lake Worth, where the railroad began. When the Brickells, who ran the trading post and also the Post Office on the southern point across the river, wished to send mail or communications to the Tuttles at Fort Dallas, north of the river, they used a rowboat.

That was how Miami navigated when Henry Morrison Flagler brought his Florida East Coast Railroad and the Royal Palm, another of his huge yellow hotels which were making famous Florida's east coast, to the little settlement in which Julia D. Tuttle had so much faith.

Born in Cleveland, Ohio, of a Pensacola, Florida, missionary father, it was she and no one else who induced Flagler to come this far south, and offered him one hundred acres of Miami land as an inducement. The Great Freezes helped her cause. There were two of them, one in December, 1894, and another in February, 1895, and the citrus growers of north and central Florida had been nearly wiped out, no help to Flagler either, who was always a keen man of business first and foremost. The groves around Miami, however, were untouched by frost and to prove the point as to desirability of opening up Miami, Flagler was sent some orange blossoms plucked in Miami in all their freshness and beauty at the very time of the freezes.

So the iron horse came south and later even went beyond Homestead and down to Key West at the

---

*Prepared for the SOUTHERN MEDICAL JOURNAL by the News Bureau of the City of Miami, Mr. Benton E. Jacobs, Manager.

Flagler Street in 1913

Flagler Street in 1946

southernmost tip of the United States. Today, there are two great railroads in Florida, linking Miami with the north, but to Henry Flagler belongs the glory; he pioneered the way and took the risks.

There was one hotel, the Miami, when Flagler's men arrived to break ground for the great Royal Palm. Even that was not finished, however, and the fare was poor and typical of the area at that time, cut off as it was from the rest of the country. Bread, bacon and grits appeared three times a day, with an occasional turtle, caught in Biscayne Bay, which was responsible for all meats requested by clients, from steak to pork chops and mutton. Overflow clients who could not be accommodated in the primitive hotel were housed in the floating hotel, the old steamboat Rockledge.

Today there are 160 hotels in Miami, many of them skyscrapers and as fine as any to be found in any city of comparable size. There are 12,750 rooms available to would-be visitors. More than 1,200 restaurants ranging from hamburger stands to the gourmet's delight cater to the appetites of visitors.

Today Miami has the usual busy city's quota of physicians and drugstores. Most of these latter are palatial affairs and able to supply everything from a prescription calling for rare drugs to the latest in soda fountain "specials." At the beginning of 1896 the nearest drugstore was one hundred miles away and, of particular interest to members of the Southern Medical Association, the only practicing physician in the area was a woman, a Dr. Simmons in Coconut Grove, a settlement far older than Miami and a calling point for boats plying their way between the north and Key West.

The early city fathers were farseeing, however, and it was through their efforts that in 1896 Dr. J. M. Jackson Jr.,* of Bronson, Florida, was brought to Miami with promise of a consulting room either at the back of the shoe store or in the rear of the drugstore then under construction.

Medical offices in Miami today compare with any in the world as to modern equipment and fine locations, but Dr. Jackson's name is perpetuated in the municipally-owned Jackson Memorial Hospital. Added to this, there are 20 private and public and two government-operated hospitals in the Greater Miami area, including convalescent homes where the sick may derive greatest benefit from the therapeutic value of Miami's sunshine.

There were only 260 people qualified to vote for Miami's incorporation as a city, after the railroad arrived. At least 40 more were imported by boat from outlying districts to make up the requisite 300. Today Greater Miami's population is more than 300,000 and still going strong. Moreover, real-estate property values have zoomed accordingly. In the early 1890's Dade County was far larger than it is now, stretched from the St. Lucie River at Stuart to Jew Fish Creek, south of Homestead, and west from the Atlantic Ocean to the western shore of Lake Okeechobee, 150 miles long by 100 miles wide, with county seat at Juno. The real-estate property value, however, was only assessed at a little more than $653,354. Today real estate in the city of Miami alone is assessed at more than $200,000,000.

Before 1896 there were no newspapers in Miami and no public to read them. That year, however, brought Miami into the headlines and it has stayed there ever since. The Miami Metropolis appeared as the only newspaper and a weekly at that. Today the Metropolis is the Miami Daily News, the city's evening paper. The

*Dr. Jackson was President of the Southern Medical Association, 1911-1912—elected at the Hattiesburg (Mississippi) Meeting in November 1911 and presided over the Jacksonville (Florida) Meeting in November 1912. He died in April 1924.

Miami Herald presents the news of the world every morning.

There was no bank in 1896, only a community safe where folk stored anything of value. Later that year the Bank of Bay Biscayne opened its doors, paid up capital $25,000. Last year clearings of the eleven banks in the Miami area were well over one billion dollars.

Even more amazing, while the Miami area now covers 46.3 square miles, in 1896 the city was only two miles long and one mile wide, bounded on the east by the blue waters of Biscayne Bay. Fifty years of progress have made a miraculous difference; the sky is as blue, the waters as sparkling and the sands as golden, but an old-timer would not recognize in the bustling metropolis of today the dusty, unpaved little settlement of 1896, with its scant clearings, mangrove swamps, lack of flowers except for a stray oleander, flimsy wood construction and sparse citizenry.

Henry Flagler changed all that, and by midsummer of the same year there were 3,000 persons in Miami. There were only two or three deaths that year, too, which discouraged the number of doctors who had at last begun to settle in the area. This was too healthy a place, they decided, for them to reckon on a good living, and many of them moved away.

Miami was definitely on the up-grade, and education began to come along. At Lemon City, Ada Merritt, bearer of a name famous today among Miami schools, was one of the first school principals. Today Miami has two colleges. The University of Miami, with a roster of more than 3,450 students, has one of the largest ex-service enrollments in the South, and provides some 500 courses to choose from ranging from vocational guidance to hydroponics. Barry College, under the auspices of the Catholic Sisters of S. Dominic from Adrian, Michigan, offers education in liberal arts, music and science to girls. Further there are also a military academy, five parochial schools, fifteen private schools and seventy-one public schools with an attendance of more than 46,000.

Miami's half-century of progress is unparalleled in the United States. The tourist center, which draws on the entire world for its clientele, is also the natural gateway between the Americas and the busiest aerial port of entry in the country. Today, Miami is only a few hours from wherever you are or want to be. Eight airlines, four cross-country buslines and two railroads see to that.

In the days before Flagler it took seven days by boat to travel from Sanford, a matter of 250 miles, via Lake Worth and the Indian River. Today Sanford is, aerially-speaking, Miami's next-door neighbor.

Magic is really an inadequate adjective where Miami is concerned. Flagler called it "City of Eternal Youth." It still has the same sub-tropical charms as when he saw it, the same perfect climate, unequalled anywhere else. Its advancement in fifty short years to one of the leading cities of the world has been, as the youth of today would say, "out of this world."

SOUTHERN MEDICAL ASSOCIATION

Fortieth Annual Meeting

Miami, Florida

Monday, Tuesday, Wednesday and Thursday

November 4-7, 1946

After Miami, Havana and/or Nassau

Preliminary Announcement, August 15, 1946

Havana Tour

AFTER MIAMI, HAVANA

"Cuba, the loveliest land that human eyes have ever seen."
—Christopher Columbus, October 1492.

Official Southern Medical Association Post-Convention Tour to Havana under direction of Mr. C. P. Loranz, Secretary-Manager, Empire Building, Birmingham 3, Alabama. Mr. Loranz will be assisted in handling the tour by Mr. Alfred Canel, Miami and Havana.

Friday, November 8

Leave Miami via Pan American World Airways in the early forenoon, 90 minutes flying time, arriving at Havana hotels in time for lunch.

The Sevilla Biltmore will be general hotel headquarters and radiating center for the tour. The Parkview and perhaps other hotels will also be used.

Lunch at hotel.

Afternoon. City trip (about four hours), starting soon after lunch and seeing Havana by day, a complete city trip, seeing and visiting points of interest within the city, including the Capitol.

Dinner at hotel.

Evening. Night trip, starting soon after dinner and seeing Havana by night, a complete city trip at night, stopping at a sidewalk cafe, seeing a Jai Alai game (pronounced Hi-Li), and visiting famous night spots.

Saturday, November 9

Breakfast at hotel.

Forenoon. Trip to historic Morro Castle and Fortress La Cabanas, the West Point of Mexico, going by automobile around Havana Bay, having pointed out the place where the Battleship Maine was sunk in 1898, and returning across Havana Harbor by boat and having lunch at El Templete, a typical Cuban restaurant on the water front.

Afternoon free.

Evening. Dinner with typical entertainment at the Sevilla Biltmore Roof Garden to which will be invited a large number of distinguished Cuban phy-

sicians and their wives, including the President of the Republic, himself a physician, Dr. Ramon Grau San Martin.

Sunday, November 10

Breakfast at hotel.

Leaving soon after breakfast for a country trip, a lovely trip into the interior of Cuba, visiting en route the Tropical Gardens and other points of interest with lunch at a typical Cuban restaurant at Mariel, some thirty-five miles from Havana, visiting the Naval Academy there, the Annapolis of Cuba, and returning in the afternoon through the best residential section of Havana.

Evening. Dinner at a typical night club with entertainment probably at Tropicana, one of the lovely night spots of Havana.

Monday, November 11

Breakfast at hotel.

Midforenoon. Visit to the Presidential Palace, walking distance from the Sevilla Biltmore and Parkview Hotels, and very probably be received by the President of the Republic.

Remainder of the day free—no plans for lunch, dinner or for the evening—the party will be on their own for the rest of the day.

Tuesday, November 12

Leaving Havana via Pan American World Airways in the early forenoon, arriving in Miami in time to make mid-day train and plane departures.

Anyone wishing to stay longer in Havana may make arrangements to do so.

The cost of the trip will be available later to those interested.

The number who may go on this trip is limited due to the limited transportation facilities and the limited number of hotel rooms available at that season. Reservations will be made in the order of their receipt at the Association office.

It will be noted that the Pan American World Airways is the mode of transportation. Now and for several years the Pan American is and has been the only way to go from Miami to Havana—there is not now and has not been for several years any boat service. It appears now that at the time of Southern Medical Association meeting the Pan American will still be the only way to go from Miami to Havana.

All sightseeing and trips will be in seven-passenger automobiles.

Nassau Tour

AFTER MIAMI, NASSAU

Official Southern Medical Association Post-Convention Tour to Nassau under direction of Mr. C. P. Loranz, Secretary-Manager, Empire Building, Birmingham 3, Alabama. Mr. Loranz will be assisted in handling the tour by Mr. Alfred Canel, Miami and Havana.

Friday, November 8

Leave Miami via Pan American World Airways around 9:30 a.m., arriving at Nassau by 11:00 a.m.

The Royal Victoria Hotel will be headquarters for the tour.

Lunch at hotel.

Afternoon free.

Dinner at hotel.

Saturday, November 9

Breakfast at hotel.

Lunch very probably at the Country Club.

Dinner at Cumberland House.

Nassau is so small and compact that no official sightseeing has been arranged. "Horse-drawn taxies" (surrey with a fringe top) and auto taxies are available at moderate rates for such short sightseeing trips as anyone may wish to make. Boats are available, both sail and motor, for trips across the bay to Hog Island for Paradise Beach. There are glass-bottom boats at moderate rates for those who may wish to see the Marine Gardens.

Sunday, November 10

Breakfast at hotel.

Forenoon free.

Leave Nassau via Pan American World Airways around noon, arriving back in Miami in the early afternoon.

Cost of trip will be available later to those interested.

Anyone who may wish to stay longer in Nassau may make arrangements to do so.

The number who may go on this tour is limited due to the limited transportation facilities and the limited number of hotel rooms available at that season. Reservations are made in the order of their receipt at the Association office.

It will be noted that the Pan American World Airways is the mode of transportation. Now and for some time Pan American is and has been the only way to go from Miami to Nassau—there is not now and has not been for some time any boat service. It appears now that at the time of our meeting the Pan American will still be the only way to go from Miami to Nassau.

Combined Havana and Nassau Tour

Tuesday, November 12

For anyone who may wish to go to both Havana and Nassau, planes from Havana will reach Miami Tuesday morning, November 12, in time to make the Nassau planes, arriving at Nassau around 11:00 a.m.

General program at Nassau for Tuesday afternoon, Wednesday and Thursday forenoons (November 12, 13 and 14) will be the same as given above under Nassau tour. Leave Nassau for return to Miami around noon Thursday, November 14, and arriving at Miami in the early afternoon.

Southern Medical News

AMERICAN DIABETES ASSOCIATION

The American Diabetes Association will hold its sixth annual session September 16-18, in Toronto, Canada, under the presidency of Dr. Joseph H. Barach, Pittsburgh, Pennsylvania. The program, the most elaborate ever held on diabetes, arranged by the University of Toronto, will be a fitting tribute to the memory of Dr. Frederick Banting as the meeting is being held at the site of his discovery of insulin. The first day will be devoted to celebrating the twenty-fifth anniversary of the discovery of insulin, among the speakers being Dr. Seale Harris, Birmingham, Alabama.

ALABAMA

Dr. Frank Sims Moody, Tuscaloosa, is the first recipient of the Marjorie Dee and Gilbert E. Fisher Fellowship in otolaryngology and bronchoscopy, which was established at the Medical College of Alabama, Birmingham, by Dr. Gilbert E. Fisher, Professor and Chief, Department of Otorhinolaryngology, in honor of his wife Marjorie Dee.

A Neuropsychiatric Institute, made possible by the Walter Haynes Foundation, has been created at the Medical College of Alabama, Birmingham. It will be located in the school's teaching hospital, the Jefferson-Hillman, which will house on one floor the newly formed Department of Neurosurgery, Neurology and Psychiatry, and all patients of the Institute.

Dr. Alston Callahan, Professor of Ophthalmology, Medical College of Alabama, Birmingham, and formerly of the Army of the United States, announces the opening of his office in Birmingham, 908 South Twentieth Street, practice limited to diseases of the eye.

Deaths

Dr. Reuben Houston Barnes, Winfield, aged 59, died recently of acute intestinal obstruction.

Dr. George Washington Kiehnhoff, Montgomery, aged 60, died recently of cirrhosis of the liver.

ARKANSAS

Dr. Sam Phillips, after completing a postgraduate course at Children's Memorial and Michael Reese Hospitals, Chicago, has reopened his office in the Donaghey Building, Little Rock, for the practice of pediatrics.

Dr. W. W. Johnston, Conway, has been appointed to a three-year residency at Gracelands Hospital, Valhalla, New York.

Dr. L. L. Hassell, Blytheville, is with the Veterans' Administration, Little Rock.

Dr. M. E. Rust, Harrison, has moved to Pawhuska, Oklahoma.

Dr. D. M. G. Frailey, Harrison, has moved to Mount Judea.

Dr. A. M. Elton, Dr. Jabez Jackson and Dr. T. E. Williams, Newport, have moved into their new clinic building.

Dr. Karlton V. Kemp, Texarkana, has been appointed part-time Obstetric Clinician for the Arkansas State Board of Health.

Dr. S. W. Chambers, Mountain Home, has been appointed part-time Disease Clinician for Baxter County.

Dr. John W. Sneed, Conway, during August took special work in electrocardiography at Cook County Hospital, Chicago.

Deaths

Dr. James L. Dibrell, Little Rock, aged 66, died July 2.

Dr. James F. Hays, Augusta, aged 71, died recently of carcinoma of the rectum and colon.

Dr. John T. McLain, Gurdon, aged 66, died June 20.

Dr. Louis Marshall Smith, Russellville, aged 42, died recently.

DISTRICT OF COLUMBIA

Dr. Norman T. Kirk, Major General, Medical Corps, U. S. Army, The Surgeon General, and Dr. Leon L. Gardner, Colonel, Medical Corps, U. S. Army, Director of Army Medical Library, Washington, recently had bestowed upon them honorary memberships in the Brazilian Academy of Military Medicine following a recommendation by Major General Florencio de Abreu, The Surgeon General of the Brazilian Army.

Dr. Thomas Parran and Dr. James S. Simmons, Washington, have been appointed members of a Committee on Awards by the Executive Board of the Lasker Foundation to carry out the project of the Foundation. The Albert B. and Mary Lasker Foundation has established, through the medium of the American Public Health Association, a series of annual awards for outstanding achievements by individuals or by health or welfare agencies in research. The objective of the awards also includes the prevention of diseases which are the major causes of death.

Dr. Charles S. White, Washington, has been named to the Board of Trustees, George Washington University for a three-year term ending in 1949.

Dr. Winfred Overholser, Washington, was elected President-Elect of the American Psychiatric Association at its 102nd Annual Meeting held recently in Chicago.

George Martin Kober Society, at its recent meeting, elected Dr. Don S. Knowlton, President; Dr. Frank M. Hand, Vice-President; Dr. Joseph L. Gilbert, Secretary; and Dr. G. Victor Simpson, Treasurer, all of Washington.

District of Columbia Rheumatism Society was organized recently and Dr. Darrell C. Crain was elected President: Dr. Charles H. McEnerney, Vice-President; and Dr. Milton C. Cobey, Secretary-Treasurer, all of Washington.

Washington Chapter of the Pan American Medical Association's new officers are Dr. Winfred Overholser, President; Dr. A. Barklie Coulter, First Vice-President; Dr. Watson W. Eldridge, Second Vice-President; Dr. Frederick A. Reuter, Secretary; and Dr. Paul F. Dickens, Treasurer, all of Washington.

Dr. William Rowlett Dorsey, Washington, and Miss Eleanor Poor Jones, Boston, Massachusetts, were married recently.

Deaths

Dr. Guy Levis Alexander, Washington, aged 74, died recently of metastatic sarcoma of the liver.

Dr. James F. Douglas, Washington, aged 82, died recently.

FLORIDA

Florida Medical Service Corporation, at its annual meeting held recently in Jacksonville, elected Dr. Leigh F. Robinson, Fort Lauderdale, President; Dr. Walter C. Jones, Miami, First Vice-President; Sister Loretta Mary, Tampa, Second Vice-President; Dr. Herbert E. White, St. Augustine, Secretary; Dr. Frederick J. Waas, Jacksonville, Treasurer; and Dr. Edward Jelks, Jacksonville, Assistant Treasurer.

Dr. W. W. Trice, Jr., Tampa, expects to remain at Ochsner Clinic, New Orleans, Louisiana for three years with a fellowship in internal medicine before returning to Tampa to practice.

Dr. Meredith Mallory, Orlando, was awarded an honorary degree of Doctor of Science at the Commencement Day Exercises as Rollins College, June 5.

Dr. Wesley W. Wilson, Tampa, has opened offices and will limit his practice to dermatology and syphilology.

Dr. and Mrs. F. A. Gowdy, Ft. Pierce, recently celebrated their golden wedding anniversary.

Dr. Milton M. Coplan, Miami, and Miss Mildred Elizabeth Hunt, were married July 14.

Dr. Grace R. Whitford and Mr. Henry Thomas Parr, both of Ozona, were married June 1.

Dr. Janet Leser, Jacksonville, and Mr. John Davis Graham, Buffalo, New York, were married June 3.

Dr. Harrison G. Palmer and Mrs. Marion B. Jones, both of St. Petersburg, were married recently.

Dr. Richard Hopkins Sinden, Dunedin, and Miss Betsy Brandon Rankin were married recently.

Deaths

Dr. Emerson Winfield Ayars, Coconut Grove, aged 79, died recently of coronary thrombosis and myocardial rupture.

Dr. Hartley E. Boorom, Sebring, aged 66, died June 14.

Dr. John Eugene Church, Lake Worth, aged 53, died recently of perforated ulcer.

Dr. Milton H. Everett, Bradenton, aged 99, died recently as a result of injuries received in a fall.

Dr. Matthew H. DePass, Gainesville, aged 77, died June 7.

Dr. Roy Kennedy Kendall, Miami, aged 27, died recently of pneumothorax and metastatic tumor.

Continued on page 72

ANNOUNCING THE SIXTEENTH ANNUAL CONFERENCE OF THE OKLAHOMA CITY CLINICAL SOCIETY

October 28, 29, 30, 31, 1946

DISTINGUISHED GUEST LECTURERS

Harrison H. Shoulders, M.D., PRESIDENT, THE AMERICAN MEDICAL ASSOCIATION, Nashville, Tennessee.

Charles L. Brown, M.D., MEDICINE, Dean and Professor of Medicine, Hahnemann Medical College, Philadelphia, Pennsylvania.

Samuel A. Cosgrove, M.D., OBSTETRICS, Clinical Professor of Obstetrics, Faculty of Medicine, Columbia University; Medical Director and Superintendent and Chief of the Staff, Margaret Hague Maternity Hospital, Jersey City, New Jersey.

Claude F. Dixon, M.D., SURGERY, Professor of Surgery, Mayo Foundation, Postgraduate School, University of Minnesota, Rochester, Minnesota.

Austin I. Dodson, M.D., UROLOGY, Professor of Urology; Urologist to Hospital Division, Medical College of Virginia, Richmond, Virginia.

Philip S. Hench, M.D., MEDICINE, Consultant and Head of a Section on Medicine; Chief of the Department for Rheumatic Diseases; Associate Professor of Medicine, Mayo Foundation, Postgraduate School, University of Minnesota, Rochester, Minn.

Waldo E. Nelson, M.D., PEDIATRICS, Professor of Pediatrics, Chief of the Pediatric Department, Temple University School of Medicine, Philadelphia, Pennsylvania.

Paul Padget, M.D., MEDICINE, Assistant Professor of Medicine, Johns Hopkins University School of Medicine; Veterans Administration, Fort Howard, Maryland.

Walter L. Palmer, M.D., MEDICINE, Professor of Medicine, Department of Medicine, University of Chicago, Chicago, Illinois.

Rawley M. Penick, Jr., M.D., SURGERY, Associate Professor of Clinical Surgery, Tulane University School of Medicine, New Orleans, Louisiana.

Leo G. Rigler, M.D., RADIOLOGY, Professor and Chief of the Department of Radiology and Physical Therapy, University of Minnesota School of Medicine, Minneapolis, Minnesota.

Richard H. Sweet, M.D., SURGERY, Instructor in Surgery, Harvard Medical School, Boston, Mass.

Richard W. Te Linde, M.D., GYNECOLOGY, Professor of Gynecology; Chief Gynecologist, Johns Hopkins University School of Medicine, Baltimore, Maryland.

James E. M. Thomson, M.D., ORTHOPAEDIC SURGERY, Lecturer in Plastic Surgery to the College of Dentistry, University of Nebraska; President American Academy of Orthopaedic Surgeons, Lincoln, Nebraska.

O. E. Van Alyea, M.D., OTOLARYNGOLOGY, Clinical Associate, University of Illinois, College of Medicine, Chicago, Illinois.

Shields Warren, M.D., PATHOLOGY, Assistant Professor of Pathology, Harvard Medical School, Boston, Massachusetts.

Alan C. Woods, Sr., M.D., OPHTHALMOLOGY, Professor of Ophthalmology; Ophthalmologist-in-chief, Johns Hopkins University School of Medicine, Baltimore, Maryland

General Assemblies **Round-Table Luncheons** **Dinner Meetings**
Postgraduate Courses **Smoker** **Commercial Exhibits**

Registration fee of $10.00 includes ALL the above features.

For further information, address **Executive Secretary,** 512 Medical Arts Building, Oklahoma City, Oklahoma

Washington University School of Medicine

THE DIVISION

FOR

POSTGRADUATE MEDICAL EDUCATION

1. Newer Methods of Diagnosis and Therapy in Obstetrics and Gynecology
   9 September to 21 September 1946
   Tuition $100.00
2. Basic Science in Surgery and the Allied Specialties
   13 September 1946 to 17 May 1947
   Tuition $500.00
3. Hospital Administration
   13 September 1946 to 17 May 1947
   Tuition $350.00

For circulars and information write

Franklin E. Walton, M.D.
Assistant Dean

WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

Euclid and Kingshighway

Saint Louis 10, Missouri

Southern Medical Association Convention

MIAMI, FLA. — NOV. 4-7

TRAVEL IN AIR-CONDITIONED COMFORT IN SPECIAL SLEEPERS ON "THE SEMINOLE"

Leave Birmingham ..... 4:50 PM—C. of Ga. Ry.
Arrive Miami ..... 5:10 PM—F. E. C. Ry.

Leave Miami ..... 12:01 PM—F. E. C. Ry.
Arrive Birmingham ..... 11:35 AM—C. of Ga. Ry.

"CITY OF MIAMI" Coach Streamliner Between Birmingham and Miami Operates Every Third Day

Leave Birmingham 10:07 PM—Oct. 30 and Nov. 2
Arrive Miami ..... 3:20 PM—Oct. 31 and Nov. 3

Leave Miami ..... 5:35 PM—Nov. 6- 9-12-15
Arrive Birmingham ..... 8:48 AM—Nov. 7-10-13-16

MAKE RESERVATIONS NOW

F. S. Vance, D.P.A. 104 N. 20th St.
Phone 3-6231 Birmingham, Ala.

Or Any Ticket Agent

CENTRAL OF GEORGIA RAILWAY

Continued from page 760

Dr. John Slater Waterman, Jacksonville, aged 70, died recently of arteriosclerotic heart disease.

GEORGIA

Dr. R. Hugh Wood, Physician-in-Chief, Emory University Hospital, Atlanta, succeeds Dr. Eugene A. Stead, Jr., as Dean of Emory University School of Medicine. Dr. Stead resigned recently to accept a position at Duke University, Durham, North Carolina.

Dr. Frank Blalock, Atlanta, has been named Medical Director, Battle Hill Tuberculosis Sanatorium, succeeding Dr. J. C. Burch, who resigned to accept the directorship of the Tuberculosis Control Unit of the City Health Department, Atlanta.

Dr. T. O. Vinson, Griffin, Health Officer for Spalding County for several years, will serve as Health Officer for Spalding, Pike and Lamar Counties, which have been combined to form a health district.

Dr. Charlotte S. Neuberg, refugee from Germany, and Macon's second woman doctor, maintains an office at the Middle Georgia Hospital, Macon, practice limited to pediatrics. Dr. Neuberg became an American citizen January 9, 1945, and recently completed a year of study at the University of Georgia School of Medicine, Augusta.

Dr. W. C. McCarver, Jr., Vidette, has opened his office for the practice of medicine at Glennville.

Dr. A. Hamblin Letton, Atlanta, recently released from military service, has resumed private practice in association with Dr. T. C. Davison in the Doctors Building, Atlanta.

Dr. J. T. Giles, recently released from military service, is a member of the staff of the Mosely Clinic and Hospital, Donalsonville.

Dr. Hervey M. Cleckley, Augusta, was elected a fellow of the American Psychiatric Association at its recent annual meeting in Chicago. Other Augusta physicians elected members were Dr. Ralph Gancher and Dr. William Vicary.

DEATHS

Dr. Grady Edward Clay, Atlanta, aged 56, died July 11.
Dr. Robert T. Coleman, Young Harris, aged 75, died recently.
Dr. Otho Napoleon Harden, Cornelia, aged 80, died recently.
Dr. Thaddeus Isaiah Hawkins, Griffin, aged 58, died June 3.
Dr. Charles Henry Ferguson, Thomasville, aged 78, died June 2.
Dr. Frank Henry Neuffer, Atlanta, aged 38, died June 16 of injuries received in an automobile accident.

KENTUCKY

Morgan-Elliott County Medical Society was organized recently at a meeting in West Liberty and elected Dr. Alec Spencer, West Liberty, President; and Dr. John L. Cox, Compton, Secretary-Treasurer.

Dr. Carl C. Howard, Glasgow, was recently chosen by the Barren County Post of the American Legion for its distinguished citizen award. Dr. Howard's work during the war and in the tuberculosis control program of the State was particularly emphasized in the presentation of the award.

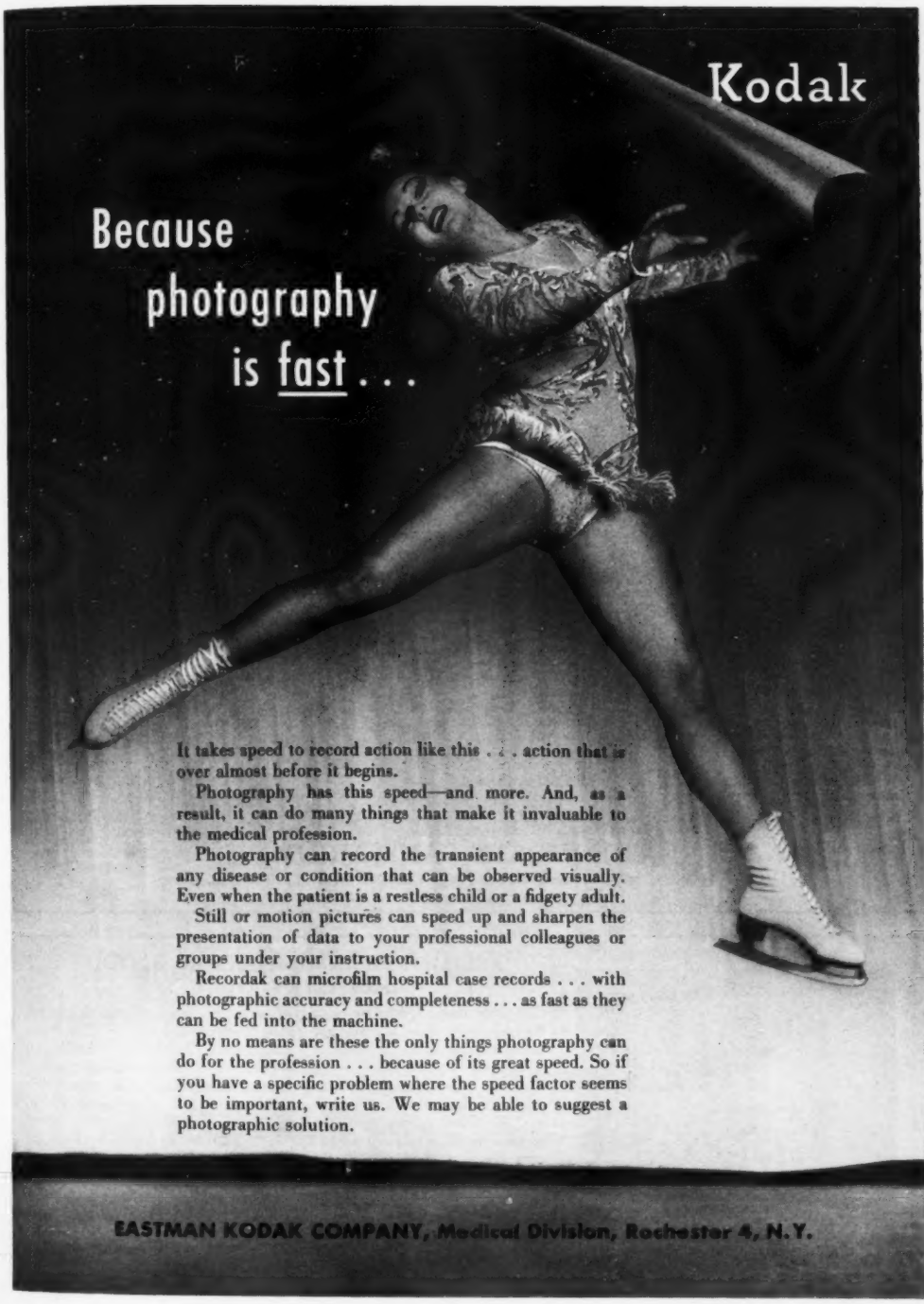
Dr. Wallace E. Rich, Danville, has been appointed Acting Superintendent, Kentucky State Hospital, Danville, an institution recently returned to the State by the Army.

Dr. Gradie R. Rowntree, Deputy Director of Health, Louisville and Jefferson County Health Department, and Associate Professor of Public Health, University of Louisville School of Medicine, Louisville, has been given a leave of absence to do postgraduate work in public health administration and in general medicine at Columbia University.

DEATHS

Dr. Joseph Milton Adair, Claypool, aged 84, died recently of heart disease.
Dr. Alonzo Johnson Bean, Brewers, aged 70, died recently of pneumonia.
Dr. Hubert Berkley Blaydes, La Grange, aged 69, died recently.
Dr. Thomas Edgar Davis, Mayfield, aged 78, died recently of angina pectoris.
Dr. Henry Handlin Duley, Paducah, aged 72, died recently of cerebral hemorrhage.
Dr. Fernando C. Hedges, Judy, aged 66, died recently of hypertensive heart disease.
Dr. Frederick Luther Koontz, Louisville, aged 70, died recently of pernicious anemia.
Dr. Joseph E. Mathews, Harned, aged 69, died recently of coronary occlusion.
Dr. John Oscar McKenney, Beaver Dam, aged 66, died recently of coronary occlusion.
Dr. James Sanders White, Campbellsville, aged 82, died recently.

Continued on page 74



It takes speed to record action like this . . . action that is over almost before it begins.

Photography has this speed—and more. And, as a result, it can do many things that make it invaluable to the medical profession.

Photography can record the transient appearance of any disease or condition that can be observed visually. Even when the patient is a restless child or a fidgety adult.

Still or motion pictures can speed up and sharpen the presentation of data to your professional colleagues or groups under your instruction.

Recordak can microfilm hospital case records . . . with photographic accuracy and completeness . . . as fast as they can be fed into the machine.

By no means are these the only things photography can do for the profession . . . because of its great speed. So if you have a specific problem where the speed factor seems to be important, write us. We may be able to suggest a photographic solution.

EASTMAN KODAK COMPANY, Medical Division, Rochester 4, N.Y.

Continued from page 72

LOUISIANA

Dr. Vernon W. Lippard, Associate Dean, Columbia University College of Physicians and Surgeons, and Associate Director, New York Postgraduate School of Medicine, New York City, has been appointed Dean, Louisiana State University School of Medicine, New Orleans, and Professor of Pediatrics. He will assume his duties on September 15.

Dr. Russell L. Holman, Professor of Pathology, University of North Carolina School of Medicine, Chapel Hill, North Carolina, has been appointed Professor of Pathology and head of the Department of Pathology and Bacteriology, Louisiana State University School of Medicine. He assumed his duties on July 20.

Dr. Myron E. Wegman, Assistant Professor of Clinical Pediatrics, Cornell University Medical College, and Director of Training and Research, Bureau of Child Hygiene, New York City Department of Health, has been appointed Professor of Pediatrics and head of the Department, Louisiana State University School of Medicine, effective September 9.

Dr. Alton Ochsner, New Orleans, was named Vice-President of the American Association for Thoracic Surgery at its recent meeting.

Dr. Jacques Magne, New Orleans, has been appointed head of the Medical Division of New Orleans Charity Hospital, and Dr. Joseph Dills, New Orleans, will have charge of the Surgical Division. Dr. Roscoe L. Pullen, who for several years has been Assistant Director of the Hospital, resigned effective July 1.

Dr. Wilbur C. Smith, New Orleans, has been appointed Director of Student Health and Physical Activities at the University of Wyoming.

Dr. L. Davis Haughton, Jr., New Orleans, and Miss Virginia Weatherly, were married recently.

Deaths

Dr. Arthur Leslie Carlton, Singer, aged 67, died recently of emphysema of the lungs.

Dr. Robert Williams Faulk, Monroe, aged 86, died recently of bronchopneumonia.

Dr. Walter Durrie Simmons, Covington, aged 55, died recently of heart disease.

MARYLAND

Johns Hopkins University, Baltimore, has established an Institute for Cooperative Research to work with government and industry.

Dr. Merel H. Harmel, Baltimore, has been selected as the first National Research Council fellow in anesthesiology, and will commence his year's work under Dr. Carl F. Schmidt, Professor of Pharmacology, University of Pennsylvania School of Medicine, Philadelphia.

Dr. Louis Hamman, Jr., Baltimore, and Miss Virginia Lee Thuss, Cumberland, were married recently.

Deaths

Dr. William Allan Brown, Hagerstown, aged 68, died recently of acute cholecystitis.

Dr. Arthur Ellis Pattrell, Towson, aged 66, died recently.

Dr. Raymond Gerard Willse, Baltimore, aged 63, died recently of acute pulmonary edema and coronary thrombosis.

MISSISSIPPI

Deaths

Dr. Clarence Lester Horton, Bay St. Louis, aged 82, died June 21, of a fall sustained while paying a professional visit and from which he never regained consciousness.

Dr. Doyle Seward, Yazoo City, aged 63, died July 18.

Dr. Dryden L. Walker, Meridian, aged 71, died July 8 of a heart attack.

MISSOURI

New Madrid County Medical Society has elected Dr. B. E. Ellis, Gideon, President; Dr. Claude McRaven, Marston, Vice-President; and Dr. J. J. Killion, Potageville, Secretary and Treasurer.

Continued on page 76

Alcoholism
Senility
Drug Addiction

A Modern Ethical Sanitarium at Louisville
Established 1904

Mental
and
Nervous Diseases

BEAUTIFUL AND SPACIOUS GROUNDS AFFORD OUTDOOR RELAXATION

Our **ALCOHOLIC** treatment destroys the craving, restores the appetite and sleep, and rebuilds the physical and nervous condition of the patient. Liquors withdrawn gradually; no limit on the amount necessary to prevent or relieve delirium.

MENTAL patients have every comfort that their home affords.

The **DRUG** treatment is one of gradual Reduction; it relieves the constipation, restores the appetite and sleep; withdrawal pains are absent. No Hyoscine or rapid withdrawal methods used unless patient desires same.

NERVOUS patients are accepted by us for observation and diagnosis, as well as treatment.

Select cases of SENILITY accepted. Physiotherapy—Clinical Laboratory—X-Ray. Consulting Physicians.

Rates and Folder on request

THE STOKES SANITARIUM

Telephones
Highland 2101
Highland 2102

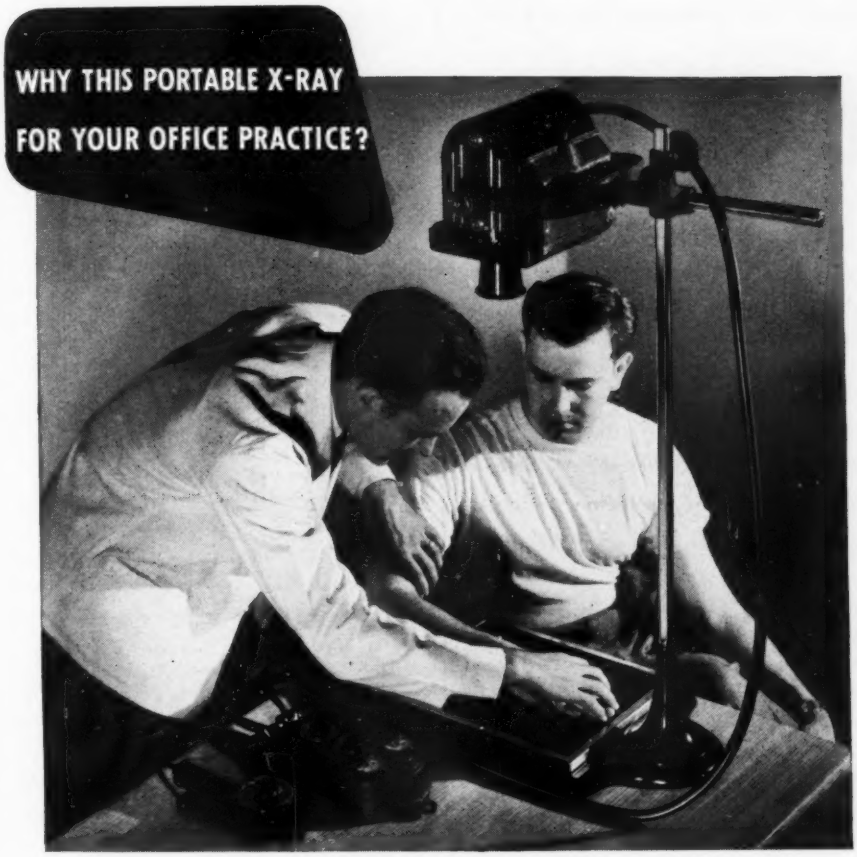
E. W. STOKES, M.D., Medical Director, 923 Cherokee Road, Louisville, Kentucky

LaMOTTE COMBINATION BLOOD CHEMISTRY OUTFITS

To meet the request of many physicians, the LaMotte Research Department has developed these compact outfits. They are ideal where space is limited. The outfit illustrated contains all necessary apparatus, reagents, etc., for determining gastric acidity, blood sugar, blood urea, icterus index, and phenolsulfonphthalein renal efficiency. Price of outfit illustrated above, $67.50 f.o.b. Towson. Similar units containing other combinations of standard LaMotte tests can be furnished. Full information will be sent on request.

If you do not have the LaMotte Blood Chemistry Handbook, a complimentary copy will be sent upon request without obligation.

LaMOTTE CHEMICAL PRODUCTS CO.
Dept. S **Towson 4, Md.**



The fact that thousands of physicians are today using G.E. X-Ray's *Model F Portable* is perhaps the most convincing evidence of its recognized value.

You, too, would soon conclude that for office x-ray examinations, particularly of fractures and dislocations, the *Model F Portable* atop your desk or table greatly simplifies matters; also that the inambulant patient is grateful for this service right in his home.

Within the practical range of service for which this unit is intended, the quality of radiographs it is capable of producing is second to none, regardless of price. You'll also appreciate the high standard of workmanship throughout.

The moderate investment required, and the potential value of a *Model F* in your practice, assuredly justify your investigation. Write today for complete information.

Address General Electric X-Ray Corp., Dept. 2566, 175 W. Jackson Blvd., Chicago 4, Illinois.

GENERAL ELECTRIC X-RAY CORPORATION

CONTEMPORARY

CRIMINAL HYGIENE

A sourcebook on the Nation's No. 1 social problem. For workers in the fields of public welfare and for the laity.

Edited by

A Psychiatrist - - - - Robert V. Seliger

A Lawyer - - - - - - - Edwin J. Lukas

A Criminologist - - - Robert M. Lindner

CONTRIBUTORS: Ralph S. Banay, Ralph Brancale, Hervey Cleckley, Victoria Cranford, Robert M. Lindner, Harry R. Lipton, Edwin J. Lukas, Sophia M. Robison, William S. Sadler, Robert V. Seliger, Negley K. Teeters, Lawrence F. Woolley.

OAKRIDGE PRESS

2030 Park Avenue, Baltimore 17, Md.

Please send Contemporary Criminal Hygiene

☐ copies cloth bound with index $4.00

Name.....

Address.....

Continued from page 74

Dr. Robert A. Moore, Professor and Head of the Department of Pathology, Washington University School of Medicine, St. Louis, has been appointed Acting Dean of the School. The Dean, Dr. Philip A. Shaffer, Sc.D., resigned to devote his time to work in biologic chemistry. Dr. Franklin E. Walton, Clayton, is Assistant Dean and Director, Division of Postgraduate Studies at the School.

Dr. Edward H. Skinner, Kansas City, was elected President, American College of Radiology at its recent annual meeting held in San Francisco, California.

Dr. Edwin C. Ernst, St. Louis, was elected Vice-President, American College of Radiology at its recent annual meeting held in San Francisco, California.

Dr. J. W. Thompson, St. Louis, has been elected a member of the Board of Trustees of Group Hospital Service of St. Louis at the recent annual meeting.

Dr. H. L. Mantz, Kansas City, was elected representative-director from Missouri to the National Tuberculosis Association at a recent annual meeting held in Buffalo, New York.

Dr. Wendell Scott, St. Louis, and Dr. Alphonse McMahon, Commodore, Medical Department, U. S. Navy, Washington, have been named to a sixteen-member Reserve Consultant Board to the Bureau of Medicine and Surgery, U. S. Navy, by Vice Admiral Ross T. McIntire, Surgeon General.

Dr. Samuel D. Katz has been released from military service and has reopened his offices in the Wall Building, St. Louis, practice limited to clinical pathology.

Dr. Dominic Joseph Verda and Miss Dorothy Wilma Fuhlage, both of St. Louis, were married recently.

Dr. Henry William Bopp, Jr., St. Louis, and Miss Joan Elizabeth Whitesell, Wellsville, were married recently.

Deaths

Dr. Albert Deans Barnet, Guilford, aged 70, died recently of cerebral thrombosis.

Dr. Dan J. Martin, Bethany, aged 87, died recently of cerebral hemorrhage.

Dr. Fred Selby Perrings, Weldon Springs, aged 57, died recently of uremia.

Dr. Edward Coleman Shelton, Eldon, aged 73, died recently of coronary sclerosis.

Dr. Charles Harvey Thomas, Bigelow, aged 82, died recently of uremia.

NORTH CAROLINA

Dr. James B. Bullitt was given a dinner by the faculty members of the University of North Carolina School of Medicine, Chapel Hill, June 5, marking his retirement as Professor of Pathology and head of the Department, ending thirty-three years' service to the University.

Highsmith Hospital staff, Fayetteville, has announced the association of Dr. Robert W. King, in internal medicine. Dr. King was recently released from military service.

Dr. John S. McKee, Jr., Raleigh, has been appointed Assistant Superintendent of State Hospital, Morganton.

Dr. Paul O. Schallert, formerly of Winston-Salem, is Chief Medical Officer at the Veterans Administration, Orlando, Florida.

Dr. Marina Hoyt Henry and Mr. William Lauren Moses, both of Chapel Hill, were married recently.

Dr. Robert Page Morehead and Miss Dorothy Ann Myers, both of Winston-Salem, were married recently.

Dr. Davis Deleon Moise, Durham, and Miss Sara Deal Purnell, Franklinton, were married recently.

Dr. Paul H. Ringer, Asheville, and Miss Mary Averell Brown, New York City, were married recently.

Deaths

Dr. Thaddeus Wirt Carmichael, Rowland, aged 71, died recently.

Dr. Thomas Leslie Carter, Gatesville, aged 53, died recently in an automobile accident.

Dr. William Columbus Morrow, Andrews, aged 63, died recently of carcinoma.

Dr. Wiley Astor Rogers, Franklin, aged 73, died recently of cerebral hemorrhage.

OKLAHOMA

Dr. Reynold Patzer, Assistant Professor of Surgery, University of Oklahoma School of Medicine, Oklahoma City, has been granted funds by the Oklahoma Division of the National Cancer Society for an experimental study on the treatment of cancer.

Deaths

Dr. James Cornelius Braswell, Tulsa, aged 53, died recently of cerebral hemorrhage.

Continued on page 78

MUSEUM OF SCIENCE AND INDUSTRY
FOUNDED BY JULIUS ROSENWALD
JACKSON PARK · CHICAGO 37

Mr. C. H. Fleck, President
S. H. Camp and Company
Jackson, Michigan

August 7, 1946

Dear Mr. Fleck:

Today marks the 10th Anniversary of the Transparent Woman exhibit and since the famous "lady" is making her permanent home in our Medical Section, we feel that the day should not be allowed to pass without some comment.

I vividly recall the premier of the Transparent Woman at Rockefeller Center in New York City before a distinguished assembly of physicians, scientists and educators. Its later tour throughout the Nation under the auspices of state and county medical societies and academies of medicine was a significant contribution to public health education. You are to be congratulated not only on your sponsorship of this important and effective exhibit but also on the ethical manner in which it was presented to the laity through the profession.

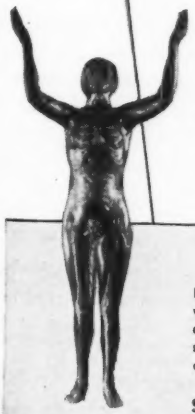
The Transparent Woman continues to be one of the major centers of interest at the museum. Practically all of the 1,026,250 visitors last year made her acquaintance and preliminary 1946 figures show the attendance running higher.

It is fitting on this 10th Anniversary of the Transparent Woman exhibit to again express our appreciation to you for your active interest in the Medical Section.

Cordially yours,

Eben J. Carey

EBEN J. CAREY, M.D., Curator,
Medical Exhibits



CAMP TRANSPARENT WOMAN EXHIBIT MARKS TENTH ANNIVERSARY

Dedicated at Rockefeller Center in 1936 by world famous figures in medicine, science and education, the *Transparent Woman* has since been viewed by some 50,000 physicians and 16,000,000 laymen. Its steady popularity in the Medical Section of the Museum of Science and Industry verifies our hope that the exhibit will continue to play its authentic role in public health education within the precepts of the medical profession.

S. H. CAMP and COMPANY · JACKSON, MICHIGAN

Healing Heat
WITHOUT CONTACT

Conditions in which patient-contact with the heat source must be avoided—infected wounds, painful sensitivity and tenderness—are but one instance of the versatility and unique usefulness of Infra-Red radiation. Beneficial in an ever-widening field of clinical applications, the Infra-Red generator is becoming indispensable office equipment in every branch of medical practice.

INFRA-RED RADIATION

—induces local hyperemia—favors increased vascular circulation, leucocytosis, phagocytosis

—increases temperature locally without significant systemic hyperpyrexia

—aids in relieving pain, spasm, stiffness, tension

THE Burdick Z-12 ZOALITE

—meets the needs of average practice. Equipment: 600-watt Burdick patented single-bar, non-metallic generator; 12-inch ventilated reflector, aluminum faced. Stand is adjustable 36 to 72 inches. Mobile. Simple to operate. For A.C. or D.C. operation.

THE BURDICK CORPORATION
MILTON WISCONSIN

Continued from page 76

Dr. Benjamin Franklin Collins, Claremore, aged 67, died recently of coronary occlusion.

Dr. George W. Slover, Sulphur, aged 79, died recently of uremia.

SOUTH CAROLINA

The annual Postgraduate Seminar of the Alumni Association of the Medical College of South Carolina will be held in Charleston, December 3, 4, and 5, instead of early in November as previously announced.

Dr. Ben F. Wyman, State Health Officer, Columbia, has been named Chairman of the Hospital Advisory Council to the State Research Planning and Development Board. Representatives on the Council from the Medical Association are Dr. Jack Parker, Greenville, Dr. Kenneth M. Lynch, Charleston, and Dr. Julian Price, Florence. .

Dr. R. S. Matthews, formerly on staff of South Carolina State Hospital, Columbia, is Medical Director, Edgewood Sanitarium, Aiken.

Dr. William Atmar Smith, Charleston, has been named Chief of Tuberculosis Division No. 5 by the Veterans' Administration, headquarters in Atlanta, Georgia.

Dr. B. F. Boyleston, recently discharged from the Navy, is associated with the Moore Clinic, Columbia.

Dr. James T. Green, formerly with the Moore Clinic, Columbia, has opened offices with practice limited to orthopedic surgery.

Dr. W. H. Powe, Jr., Greenville, has been doing refresher work in internal medicine in New York.

Dr. Paul P. Hearn, Greenville, recently released from service, is associated with Dr. Matthew N. Hosner in the practice of ear, nose and throat.

Dr. Fletcher Jordan, Greenville, was recently honored by a public testimonial being held in recognition of this thirty-eight years' service to the community. He was presented with a 1946 Chrysler and a silver set which included a silver tray carrying the inscription "In token for his service to mankind."

Dr. Floyd Wolfe Denny, Jr., Hartsville, and Miss Barbara Elizabeth Horsefield, were married recently.

Deaths

Dr. Charles Anderson Dawkins, Union, aged 65, died recently.

Dr. Wilfred J. Rivers, Eastover, aged 82, died recently.

Dr. Robert E. Seibels, Jr., Columbia, aged 28, was accidentally killed recently in a skiing accident on Mt. Baker, Washington.

Dr. Charles A. Speissegger, Charleston, aged 65, died June 3.

TENNESSEE

Dr. James B. Black, Murfreesboro, has resigned as Health Officer, Rutherford County, after completing nineteen years in that position.

Dr. Edward C. Mulliniks, Kingsfoot, has been named Director, Washington County Health Department.

Dr. Edmund W. Benz, Nashville, announces the opening of his office in the Bennie-Dillon Building for the practice of general surgery.

Dr. J. Warren Kyle, Tullahoma, and Miss Eleanor Whitney were married recently.

Deaths

Dr. William B. Battle, Gallaway, aged 90, died recently of carcinoma.

Dr. Fountain Miles Blankenship, Hartsville, aged 68, died July 2.

Dr. Robert C. Derivaux, Nashville, aged 58, died June 15 of coronary thrombosis.

Dr. Elizabeth Franklin, Memphis, aged 32, died recently of pulmonary tuberculosis.

Dr. Joe B. Lackey, Ripley, aged 62, died June 24.

Dr. Sidney Lee Mackey, Johnson City, aged 65, died recently of coronary occlusion.

Dr. Dudley Dunn Saunders, Jr., Memphis, aged 77, died recently of subacute monocytic leukemia.

Dr. Harry Shelton Smythe, Mountain City, aged 60, died recently of injuries received in an automobile accident.

Dr. Joseph Boon Stone, Memphis, aged 66, died recently of cerebral hemorrhage.

Dr. Claude Henry Temple, Memphis, aged 73, died recently of arteriosclerotic heart disease and diabetes mellitus.

TEXAS

Dallas Academy of Ophthalmology and Otolaryngology has elected Dr. Speight Jenkins, President; Dr. Claude Winbora, Vice-President; and Dr. E. L. Darrough, Secretary-Terasurer, all of Dallas.

Continued on page 82

3 INJECTIONS—
3 PROTECTIONS

against { *Diphtheria*
Tetanus
Pertussis

1 Quickly effective against all three diseases.
2 Economical.
3 Immunization starts with the first injection.
4 Protection is accomplished with three injections.

Each cc. of Diphtheria-Tetanus-Pertussis Combined contains: H. pertussis killed—10,000 million; diphtheria toxoid—0.33 cc., and tetanus toxoid—0.33 cc. The toxoids are adjusted to the 0.5 cc. human dose concentration, so that in the complete treatment (three injections), the full amount (1 cc.) of each toxoid, as recommended by Public Health authorities, is injected. Write for professional literature. ***The National Drug Company, Philadelphia 44, Pa.***

DIPHTHERIA-TETANUS-PERTUSSIS COMBINED A. P.

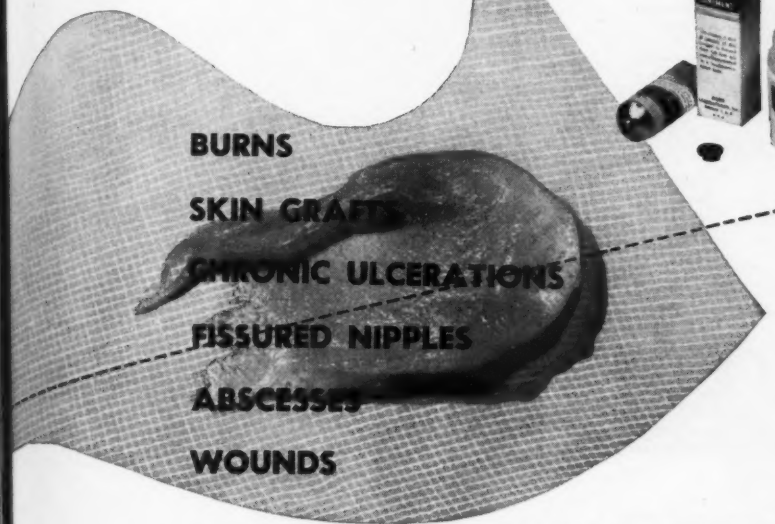
Supplied in single-immunization packages of three 1 cc. vials each, and in five-immunization packages containing three 5 cc. vials.

The NATIONAL DRUG COMPANY

PHARMACEUTICALS, BIOLOGICALS, BIOCHEMICALS FOR THE MEDICAL PROFESSION

White's
White
LABORATORIES, INC. Pharmaceutical Manufacturers, Newark 7, N. J.

swifter healing . . . .



Mounting clinical evidence emphasizes the value of topically applied vitamins A and D for prevention and treatment of postpartum fissured nipples, and as a notably effective aid to healing in all surface lesions involving epithelial denudation.

Therapeutic advantages: promotes healthy granulation and rapid epithelization, inhibits infection, minimizes skin grafting, destroys no epithelial elements, does not cause contractures, forms no tenacious coagulum.

White's Vitamin A and D Ointment provides the natural vitamins A and D, derived from fish liver oils and in the same ratio as found in cod liver oil, in an appropriate lanolin-petrolatum base. Mildly fragrant, free from excess oiliness; keeps indefinitely at ordinary temperature. Ethically promoted—not advertised to the laity.

Available in ½ oz. tubes; 8 oz. and 16 oz. jars and 5 lb. containers.

Vitamin A and D ointment

A complete line for clinical laboratories devoted to all branches of chemistry, bacteriology, hematology, and parasitology. Tested and checked in our own clinical laboratories. Purity warranted. Our facilities assure prompt shipment of large or small orders. Inquiries invited.

COMPLETE CATALOG

and Medical Reference Guide

Reagents catalogued alphabetically—also according to subjects and techniques, plus medical reference guide. Catalog comprises full line blood testing sera including anti-Rh, anti-M and anti-N; also reagents for Wassermann, Kline, and Kahn tests. Write for your copy. FREE ON REQUEST.

GRADWOHL
LABORATORIES
R. B. H. Gradwohl, M. D., Director
3514 Lucas Av. St. Louis, Mo.

Continued from page 78

University of Texas School of Medicine Alumni Association has installed Dr. George M. Underwood, Dallas, President; and has elected Dr. Robert B. Homan, El Paso, President-Elect; and Dr. George V. Brindley, Temple, Vice-President.

Dr. L. Barnes, Hubbard, has retired from practice after fifty-five years.

Dr. I. P. Sessions, Health Officer for Rockdale for more than thirty years, has resigned because of ill health.

Dr. Clarence I. Shult and Dr. J. H. Wooten, Jr., Columbus, have opened the Columbus Hospital and Clinic.

Dr. Austin M. Long, Valley Mills, has opened a clinic and laboratory and will have associated with him Dr. T. A. Koerner, Coryell City.

Dr. William L. Hart, Brigadier General, U. S. Army, retired, former Chief Surgeon of the Eighth Service Command, succeeded Dr. Donald Slaughter as Dean of Students, Southwestern Medical College, Dallas, effective August 1. Dr. Hart will also assume the administrative duties of Dr. Tinsley R. Harrison who has asked to be relieved as Dean of the Faculty to devote his full time to research and teaching. Dr. Harrison will remain Professor of Internal Medicine of the College. Dr. Slaughter is now Dean, University of South Dakota Medical School, Vermillion, South Dakota.

Dr. Robert A. Miller, San Antonio, has been elected a Vice-President of the American Society of Anesthesiologists.

The Baylor Free Diagnostic Center has been established at Baylor University Hospital, Dallas, to serve patients unable to pay from throughout the Southwest.

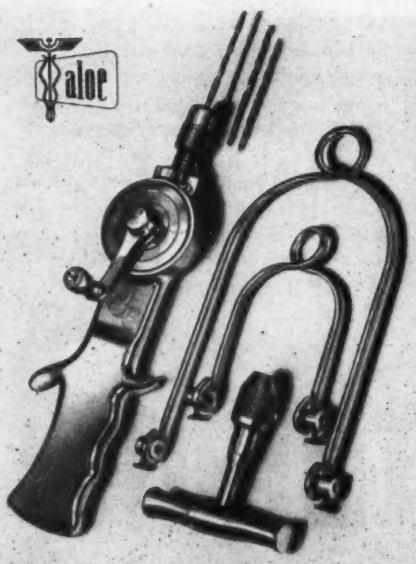
University of Texas School of Medicine, Galveston, has received a grant from Smith, Kline and French Laboratories, Philadelphia, Pennsylvania, for the support of studies on hypertension conducted under the direction of Dr. Eric Ogden, Professor of Physiology; and a grant from J. P. Roerig and Company, Chicago, Illinois, for the support of special cytologic studies under the direction of Charles M. Pomerat, Ph.D., Professor of Anatomy.

Dr. Jerome Olkin Ravel and Miss Marjorie Joanne Macow, both of Austin, were married recently.

Dr. Otto Roger Hollan, Sinton, and Miss Edith Ann Lingle, Lancaster, Pennsylvania, were married recently.

Continued on page 84

aloe



GOVERNMENT SURPLUS

. . . approximately 1/3 list, quality fully certified

We have obtained from War Assets Corporation a large quantity of the excellently made instruments illustrated which we can offer at the following very favorable prices.

3B122G — Kirschner Hand Drill (A), chrome plated body with stainless steel chuck, complete with 3 twist drills, sizes 1/16", 3/32", and 1/8-inch, standard price $29.50, special, only..... $10.00

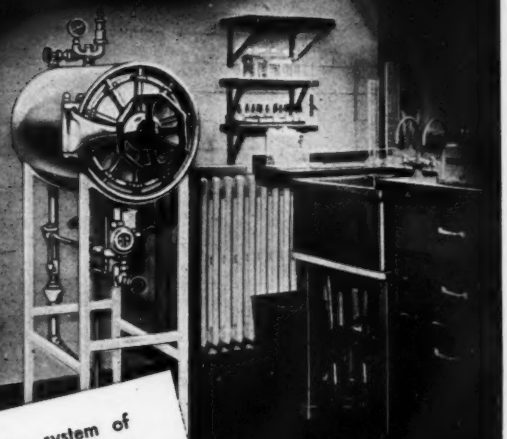
3B123G — Bohler-Steinman Pin Set, consisting of chrome plated Adjustable Chuck Handle (B), one each stainless steel Bohler-Steinman Pin Holders (B and C), medium adult and child sizes, standard price $14.50, special, only..... $5.85

3B124G — Special Bone Set, consisting of one each of the above listed instruments, standard price $44.00, special, only..... $12.50

A. S. ALOE COMPANY — 1831 Olive St. — St. Louis 3, Mo.

Functional Precision . . .

WHICH PERMITS THE ESTABLISHMENT AND EXACT DUPLICATION OF ANY GIVEN PERFORMANCE



AMERICAN LABORATORY AUTOCLAVES

Dependable equipment featuring a unique system of valving and automatic control mechanisms which insure optimum efficiency and facilitate operation by other than highly skilled technicians.

STEAM JACKETED TYPE . . . for maximum utility

INCORPORATES SPECIAL VALVING perfectly suited for slow exhaust of chamber pressure as required for media and solutions . . . valving for coagulation and sterilization of blood serum slants . . . valving for streaming steam performance.

WILL ACCOMMODATE DRY SUPPLIES. Pressure generated and maintained in the jacket throughout the performance eliminates the formation of condensate which would normally be absorbed by a dry load.

AVAILING CONTINUOUS SERVICE—one load after another—the fact that it is unnecessary to cool down the entire apparatus between loads offers time-saving and fuel-conserving economies.

SINGLE WALL TYPE

While not adapted for wrapped supplies such as dressings, or loads which require drying out in the chamber after sterilization, the American Single Wall model is unexcelled for media, solutions and the various performances ordinarily required of the laboratory autoclave.

NOTE: Authoritative data on regulation of pressure; exposure periods for various loads; timing of exposed periods; minimum requirements for destruction of pathogenic spores; sterilization of heat-sensitive and mixed loads, available to Laboratory Technicians on request. Please state institutional affiliation.

WRITE TODAY for descriptive literature

AMERICAN STERILIZER COMPANY

Erie, Pennsylvania

DESIGNERS AND MANUFACTURERS OF SURGICAL STERILIZERS, TABLES AND LIGHTS

Classified Advertisements

OPPORTUNITIES AVAILABLE

Wanted—(a) Internist to become associated with surgeon, well established in southwestern town of 30,000; starting salary of $850 first six months, then percentage; advantageous if particularly well qualified in gastroenterology; Southwest (b) Young woman physician, preferably with experience in student health work or in general practice, for appointment with young woman's college; no teaching, duties entirely clinical with emphasis on preventive medicine; South. (c) Orthopedic surgeon; group and hospital practice; Diplomate, American Board, 45-55 preferred; $6,000-$10,000; Southeast. ((d) Ophthalmologist, Diplomate of American Board, to become associated with group specializing in ophthalmology-otolaryngology and operating own hospital; position is that of associate and will eventually lead to full partnership; South. (e) Young pediatrician to become associated with Diplomate American Board of Pediatrics well established in university medical center and holding important faculty appointment; opportunity for securing unusual training in private practice of pediatrics; woman eligible. (f) Health commissioner; middle-aged man well trained in public health administration; progressive program; Southeast. (g) Assistant by radiologist, Diplomate of American Board; duties consist of assisting in x-ray department of 300-bed hospital; young man with two years' training in x-ray and working toward certification preferred; young man interested in completing training eligible; seaport town of South. (h) Assistant by Diplomate of American Board of Orthopaedic Surgery, well established in metropolitan center of the Southeast; unusual opportunity. (i) Young physician trained in pathology, anatomy or bacteriology for special investigative work and teaching in the related phases of orthopedic surgery; full-time; university medical center; $4,000 plus an additional $1,000 for equipment and supplies for research. For further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago, Ill.

OPPORTUNITIES WANTED—Young urologist, Diplomate of the American Board, wishes association with Southern group of specialist; five years' training in urology and urologic surgery; considerable teaching experience; for further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago, Ill.

Young surgeon, graduate of the University of Louisville, is available for assistantship to Diplomate of American Board of Surgery or association with group; three years' training in surgery, eligible for examination, of the American Board; available immediately. For further information please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago, Ill.

Established Hospital for Lease or Sale—A sanitarium for nervous, mental, alcoholic and drug cases, doing an excellent business. Established in 1904. It is necessary to see the institution to appreciate its real value. Write Dr. E. W. Stokes, 923 Cherokee Road, Louisville 4, Kentucky, for further information.

WANTED—Young physician as Health Officer for Southern City of 35,000. Good schools, churches, fine climate. Salary open. Address Dept. S-5, care Journal.

WANTED—Eye, Ear, Nose and Throat doctor to take charge of my office. Established 27 years. Good middle Tennessee town of 5,000. Retiring. Address inquiries to T-14, Southern Medical Journal, Empire Building, Birmingham, Alabama.

WANTED—Physicians for health officer positions in county and district health departments in Oklahoma. Salary range according to public health training and experience $4800 to $6600 plus travel expense. Beginning salary with no previous training or experience $4200 to $4800 plus travel expense. Address Commissioner of Health, Oklahoma State Department of Health, Oklahoma City 5, Oklahoma.

Continued from page 82

DEATHS

Dr. Clarence Earnest Betts, San Antonio, aged 68, died recently of coronary occlusion.

Dr. Francis Cates Ford, Houston, aged 70, died recently of coronary occlusion.

Dr. Travis M. Harrell, Corpus Christi, aged 84, died recently of myocarditis.

Dr. Charles Martin Hoch, Smithville, aged 62, died recently of coronary disease.

Dr. G. A. L. Kusch, Gay Hill, aged 70, died recently.

Dr. Edgar Poe Shelton, Dripping Springs, aged 79, died recently of cerebral hemorrhage.

VIRGINIA

Amelia County Medical Society has elected Dr. James T. O'Neal, Amelia, President; Dr. A. A. Arhart, Amelia, Vice-President; and Dr. James L. Hammer, Mannboro, Secretary-Treasurer, re-elected.

The Twentieth Annual Spring Graduate Course in Ophthalmology and Otolaryngology will be held at the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, April 7-12, 1947.

American Association of Obstetricians, Gynecologists and Abdominal Surgeons will be held at Hot Springs, September 5-7. Dr. James R. Bloss, Huntington, West Virginia, is Secretary.

Dr. Isaac A. Bigger, Richmond, was elected President of the American Association for Thoracic Surgery at its recent meeting.

Dr. J. Clarence Funk, Sc.D., has resigned as Director of Health Education in the Virginia Department of Health, Richmond, effective September 1, after being associated with the Department for ten years.

Dr. John Randolph Gambill, Jr., and Miss Wilmer Peck Peters, both of Harrisonburg, were married recently.

Dr. Charles M. Caravati, Richmond, recently released from military service, has reopened his office and has associated with him Dr. James M. MacMillan, formerly of the Henry Ford Hospital Clinic, their practice being limited to internal medicine.

Dr. O. N. Shelton, Orange, is with the Veterans Hospital, Tucson, Arizona, as Chief of Tuberculosis.

Dr. James Volpe, Jr., formerly of Jonesville, is located at Yuma, Arizona.

Dr. H. E. Jenkins, recently released from medical services with the Navy, has been appointed Health Officer of the Southside Health District.

Dr. O. Cameron Kress, recently released from medical services with the Navy, has been appointed Health Officer of Orange County Health District.

Dr. Charles G. Souder, recently released from military and Red Cross service, has been appointed Health Officer of Loudoun County Health District.

Dr. S. S. Shouse, recently released from medical services in the Navy, has been assigned Health Officer of Charlotte County Health District.

Dr. J. C. Neale, Jr., Assistant Director of Local Health Services, has been transferred from the Southeast District Office at Norfolk to the Central Office in Richmond.

Dr. J. G. McNiel, Health Officer of the Southside District, has been appointed Assistant Director of Local Health Services in charge of the Southeast District in Norfolk.

Dr. W. A. Plecker, Richmond, veteran registrar of Vital Statistics in the State Health Department, has resigned.

Dr. Joseph Stuart Staley and Miss Dorothy Maxine Thomas, both of Marion, were married recently.

Dr. Oscar Lee Ramsey, Gretna, one of Pittsylvania County's oldest and most beloved physicians who has practiced in the Gretna community for forty years, was recently presented with an automobile as a token of esteem, the program being sponsored by the Gretna Chamber of Commerce.

Dr. Bernard H. Kyle, Lynchburg, announces that Dr. B. K. Mundy is now associated with him in the practice of orthopedic and fracture surgery.

Dr. M. Pierce Rucker, Richmond, was elected First Vice-President of the American Gynecological Society at its sixty-ninth annual meeting held recently at Hershey, Pennsylvania.

Dr. William T. Moore, recently released from military service, is associated with Dr. H. C. Spalding, Richmond, with practice limited to obstetrics and gynecology.

Dr. Stanley H. Macht, formerly of Crewe, has accepted the positions of Chief, Department of Radiology, Baltimore City Hospitals, and Associate Professor of Radiology on the faculty of the University of Maryland Medical School.

DEATHS

Dr. Ashby Clifford Byers, Harrisonburg, aged 71, died June 14 of a heart attack.

Dr. William Curtis Gibson, Suffolk, aged 59, died June 10.

Dr. George F. Holler, Waynesboro, aged 70, died June 16.

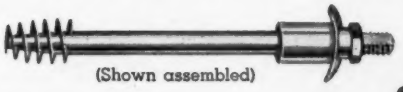
Continued on page 86

Now Improved and Manufactured by
the Zimmer Manufacturing Co.

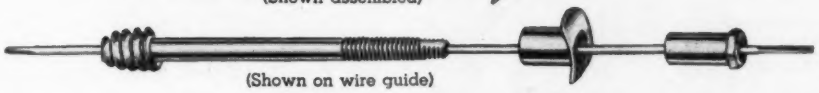
MOREIRA STUD-BOLT SCREW

For Operative Treatment of Fracture of the Neck of the Femur

Screw shown in position illustrating strong impaction produced when lock nut is tightened.



(Shown assembled)



(Shown on wire guide)

MOREIRA STUD-BOLT SCREW

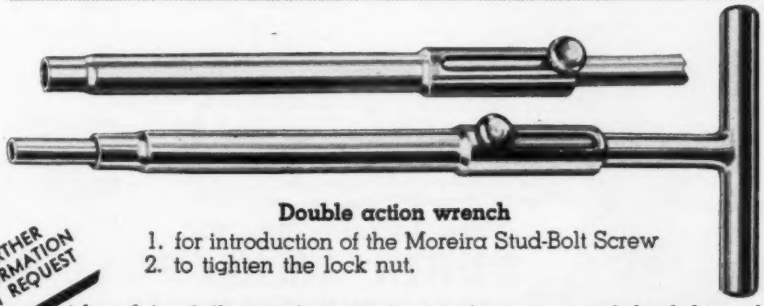
Available in 6 lengths: (Stainless Steel Only)

2 - 61/64 3 - 17/64 3 - 11/32 3 - 35/64 3 - 3/4 3 - 15/16

Trephine for perforation of cortex

(with movable piece to eject bone fragment)

Drill for screw channel through trochanter and neck of femur.



Double action wrench

1. for introduction of the Moreira Stud-Bolt Screw
2. to tighten the lock nut.

FURTHER INFORMATION ON REQUEST

Adapted for drilling with standard surgical motor or with hand driven bone drill.

Zimmer

MANUFACTURING CO. WARSAW, IND.

Continued from page 84

Dr. John Calhoun Leonard, Roanoke, aged 70, died recently.
Dr. George Alexander Moore, Roanoke, aged 46, died recently of coronary occlusion.

WEST VIRGINIA

Dr. Bruce H. Pollock, Southside, has resigned as Deputy State Health Commissioner to become Chief of the Outpatient Service for the Veterans Administration, Huntington.

Dr. W. E. McIlvaine, Moundsville, succeeds Dr. G. C. Hill as Health Officer for Marshall County. Dr. Hill has relocated at Live Oak, Florida.

The Quick, Easy Way to Strain **FRESH** *Foods*

The Foley Food Mill conserves mother's time and energy in straining fresh vegetables and fruits. With just a few turns of the handle, the Foley Food Mill separates fibres and hulls, pureeing all cooked foods fine enough for the smallest baby or adult diet—peas, carrots, beets, string beans, spinach, apple sauce, prunes. Made of steel, rust- and acid-resistant. Available through department and hardware stores, or send coupon.

Retail price $1.50. Special Offer to doctors, 1 only, $1.00 postpaid.

FOLEY FOOD MILL

FOLEY MFG. CO. 85-9 Second St. N. E. Minneapolis 13, Minn.
I enclose $1.00 for 1 Household Size Foley Food Mill.
Name.....
Address.....

Dr. Thomas C. Sims, of Fayette County, has been named Health Officer for District No. 1, comprising Braxton, Clay, Nicholas and Webster Counties, with headquarters at Sutton.

Dr. Leo F. Steindler, who has been associated with the Veterans Administration for more than twenty-five years, succeeds Dr. P. R. Copeland as Chief Medical Officer for the Veterans Administration regional office at Huntington.

Dr. Ray M. Bobbitt, Dr. Ivan R. Harwood and Dr. Gilbert A. Ratcliffe, all of Huntington, were hosts to a banquet in Huntington, July 12, honoring all of the members of the Cabell County Medical Society who have returned from military service.

Dr. Walter E. Vest, Huntington, has tendered his resignation as a member of the State Health Department's Committee on Approval of Laboratories, and Dr. W. W. Point has been appointed as representative of the Public Health Council on that Committee. Other members are Dr. F. C. Hodges, Huntington, representing the State Medical Association; Dr. E. J. Van Liere, Morgantown; Dr. Kathryn Cox, and John C. Hume, P. A. Surgeon (USPHS), Director of the Bureau of Veneral Disease Control of the State Health Department.

West Virginia Tuberculosis and Health Association will hold its first statewide postwar meeting at Waldo Hotel, Clarksburg, September 20-21.

Dr. Andrew Sackett, formerly of Pensacola, Florida, has been appointed Chief Medical Officer, Kanawha Valley Medical Center, South Charleston, succeeding Dr. D. J. McNairy who has entered private practice at Fort Wayne, Indiana.

Dr. M. H. Maxwell, Red Jacket, has moved to Moorefield.

Dr. F. D. Fortney, Newburg, is on the staff of Pinecrest Sanitarium, Beckley.

Dr. W. G. C. Hill, Moundsville, has moved to Live Oak, Florida, where he is a member of the staff of the Suwanee County Health Unit.

Dr. G. O. Crank, Lawton, has accepted a position with the Veterans Administration and is located at the sub-regional office at Clarksburg.

Dr. J. W. Carney, Logan, has moved to Newport News, Virginia.

Dr. Harry D. Chambers, formerly of Whitesville, has moved to Huntington.

Dr. F. G. Prather, formerly of Wharton, has moved to Asheville, North Carolina.

Dr. E. R. Cooper, formerly at Weston State Hospital, is in charge of the gynecological section of the Southwestern State Hospital, Marion.

Dr. James S. Vermillion, Welch, has moved to Kingsport, Tennessee.

Dr. Roberta Hall, Weston, having completed her internship at the St. Louis City Hospital, St. Louis, Missouri, is on the staff at the City Hospital, Weston.

Dr. A. J. Viehman, Huntington, has moved to Lexington, Kentucky, where he is a member of the staff of the Julius Marks Sanitarium.

Dr. Fritz Levy, Elkins, is Pathologist at the Veterans Hospital, Huntington.

Dr. Darrell A. Campbell, Charleston, has moved to Ann Arbor, Michigan.

Dr. J. W. Walters, Wheeling, has located at Toledo, Ohio.

DEATHS

Dr. Maury Anderson, Dunbar, aged 72, died July 5 of a heart disease.

Dr. Archibald Don Kessler, Huntington, aged 48, died June 26 of a heart attack.

Dr. Henry Evans Baum, Charleston, aged 54, died recently.

Dr. Courtney Bernard Wright, War, aged 46, died recently.

"very satisfactory ... in securing prompt and prolonged relief" *in bronchial asthma,* says Dees (J. Allergy 14:492, 1943) of Aminophyllin rectal suppositories.

ACCEPTED AMERICAN MEDICAL ASSN.

Very satisfactory are...

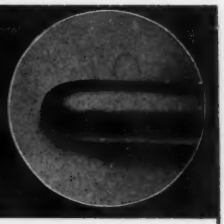
DUBIN AMINOPHYLLIN

RECTAL SUPPOSITORIES **(0.36 Gm. each)**

Dubin Aminophyllin (theophylline-ethylenediamine) also in Tablets, Ampuls, Powder for rapid action in many indicated cardio-respiratory conditions.

H. E. DUBIN LABORATORIES, Inc., 250 East 43rd St., New York 17, N.Y.

RADON SEEDS



FOR safety and reliability use composite Radon seeds in your cases requiring interstitial radiation. The Composite Radon Seed is the only type of metal Radon Seed having smooth, round, non-cutting ends. In this type of seed, illustrated here highly magnified, Radon is under gas-tight, leak-proof seal. Composite Platinum (or Gold) Radon Seeds and loading-slot instruments for their implantation are available to you exclusively through us. Inquire and order by mail, or preferably by telegraph, reversing charges.

THE RADIUM EMANATION CORPORATION
GRAYBAR BLDG. Telephone MU 3-8636 NEW YORK, N. Y.

Are you SURE . . .

. . . your primary instruments for otological diagnosis are up-to-date, doing their jobs efficiently?

A-O provides two otoscopes well known to the medical professions for advanced design, ease of use and flexibility:

The FLASHLIGHT Otoscope: A magnifying lens that can be swung out of position for convenient insertion of operating instruments . . . A removable lamp housing with dual adjustments . . . Adaptablity to the A-O aspirating and massaging device . . . Use of ordinary, easily-replaceable flashlight lamps.

The PRISM Otoscope: A totally reflecting prism set below the observation hood to eliminate reflection from the back . . . Instrument head set at an angle to allow unobstructed path for manipulation of operating instruments . . . Uses A-O massaging and aspirating device.

Check your present equipment to be sure it incorporates the latest advances and is doing its job efficiently, fully.

1020B PRISM

1022B-5 FLASHLIGHT

American Optical COMPANY

The Unseen Quality of DEXTRI-MALTOSE

DEXTRI-MALTOSE is no ordinary carbohydrate. Step by step, its manufacture is surrounded with every care and precaution, evolved through long years of experience and research.

Unseen by physician and patient are numerous safety factors, the practical effect of which nevertheless is present in every package of Dextri-Maltose. To name a few of these:

1. Dextri-Maltose is sampled for bacteriological testing before drying.
2. Steam under pressure sterilizes Dextri-Maltose filter presses which remove proteins, fat, and indigestible residue.
3. Blood agar tests are made to insure absence of hemolytic cocci.
4. Bacteriological tests are made in a steam-washed plating room, the air of which is filtered.
5. Dextri-Maltose containers are automatically filled and closed without human handling of the product.
6. The direct microscopic test which Dextri-Maltose receives is but one microbiological test which it must routinely meet.
7. The interiors of the large converters in which Dextri-Maltose is processed are thoroughly scrubbed prior to steam sterilization.
8. Steaming under pressure sterilizes the converters for processing Dextri-Maltose.
9. After being packaged, Dextri-Maltose is held in storage and released only after final approval from the bacteriological checking laboratory.
10. Portable equipment used in manufacturing Dextri-Maltose is sterilized in autoclaves under steam pressure.
11. Dextri-Maltose is tested routinely to check the keeping quality of prepared feedings held in refrigeration for 24 hours.

Among other important measures in the sanitary control of Dextri-Maltose is the careful selection of employees. All new employees must pass complete medical examinations, and conscientious efforts continue to be made to maintain their health.

It is, therefore, no mere coincidence that Dextri-Maltose enjoys greater pediatric acceptance today than ever before. By constant research and everlasting watchfulness, we try to keep pace with pediatric progress, and we put forth every human effort to merit the continued respect and confidence of the medical profession.

The True Measure of Economy Is Value

SANITARY CONTROL OF DEXTRI-MALTOSE
No. 7 OF A SERIES

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons. Mead Johnson & Company, Evansville 21, Indiana, U.S.A.

a Poor Scholar . . . because of a Poor Breakfast

MANY a child is scolded for dullness when he should be treated for undernourishment. In hundreds of homes a "continental" breakfast of a roll and coffee is the rule. If, day after day, a child breaks the night's fast of twelve hours on this scant fare, — or less — small wonder that he is listless, nervous, or stupid at school.

Pablum offers a happy solution to the problem of the school-child's breakfast. Mothers who learn about Pablum from their physicians are delighted to serve it, for it needs no cooking and can be prepared in a minute at the table — more quickly than many less nourishing foods. Right now, this feature is especially valuable in homes where the mother is engaged in war work. Pablum not only ends the bane of long cooking of cereals but in addition furnishes a variety of minerals (calcium, phosphorus, and iron) and the vitamin B complex. It is an excellent vehicle for milk.

PABLUM is rich in calcium and iron, minerals likely to be deficient in the school-child's diet yet needed in more than average amounts during childhood. Numerous clinical studies have demonstrated that Pablum gives good weight gains and increases hemoglobin values in both normal and sick infants and children. Reprints on request of physicians.

Pablum (Mead's Cereal thoroughly cooked) is a palatable cereal enriched with vitamin- and mineral-containing foods, consisting of wheatmeal, oatmeal, wheat embryo, cornmeal, beef bone, alfalfa leaf, brewers' yeast, sodium chloride and reduced iron. (The oatmeal form of Pablum is called Pabena.)
MEAD JOHNSON & COMPANY, EVANSVILLE 21, IND., U.S.A.

"TOMMY, that's the third time this week you haven't learned your lesson. Why don't you listen to me when I tell you how to work the problems?"

"...Unto the Third and Fourth Generation..."

PROTECTION against congenital syphilis can often be accomplished by treatment of the expectant mother.

Proper antisyphilitic therapy during pregnancy can prevent or control syphilis in the infant . . . lower the mortality rate in fetal syphilis . . . reduce the frequency of premature labor—even if the antisyphilitic course is comparatively short and the child not cured. Syphilis in mothers can be well started toward symptomatic and serologic cure.

MAPHARSEN (meta-amino-para-hydroxyphenyl arsine oxide (arsenoxide) hydrochloride) gives maximum therapeutic effect—rapid disappearance of spirochetes and prompt healing of lesions. Minimal untoward reactions are less severe than those observed after use of arsphenamines.

MAPHARSEN

PARKE, DAVIS & COMPANY

DETROIT 32, MICHIGAN